Přírodovědecká fakulta MU Brno

Srovnávací fyziologie živočichů

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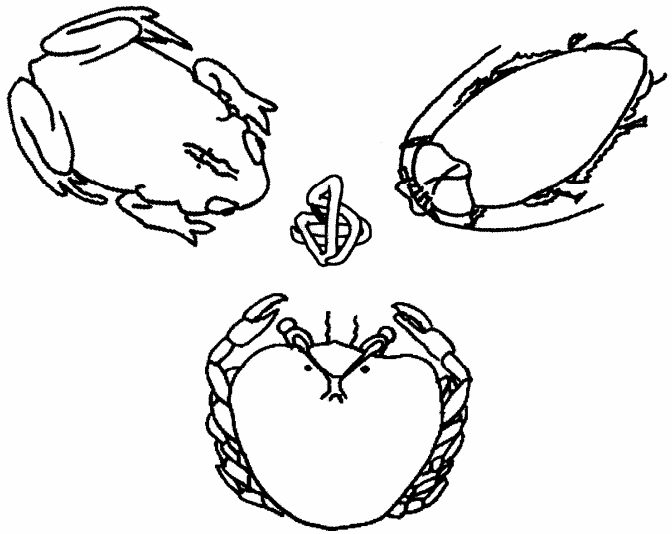

Brno 2002

Doktorské studium - Microsoft Internet Explorer

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Katedra srovnávací fyziologie živočichů a obecné zoologie

Přírodovědecká fakulta Masarykovy univerzity Brno, CZ-611 37, Kotlářská 2, tel. 541 129 498, fax 541 211 214

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Zde je k dispozici přehled předmětů vyučovaných katedrou a také některé učební texty.

Dokumenty doc. Vladimíra Ptáčka

Dokumenty dr. Martina Váchy:

Příklady testovacích otázek z Fyziologie živočichů

Učební text **Srovnávací fyziologie živočichů** ve formátu PDF ke stažení: kap1-3, kap 4-6, kap 7-9, kap 10-11, kap 12-13, kap 14-15, kap 16-18.

Dokumenty doc. Aleny Žákovské KOMPLETNÍ

Níže jsou k dispozici dokumenty ve formátu *.doc (Winword), které Vám mohou sloužit jako hrubý podklad k přednáškám z IMUNOLOGIE.

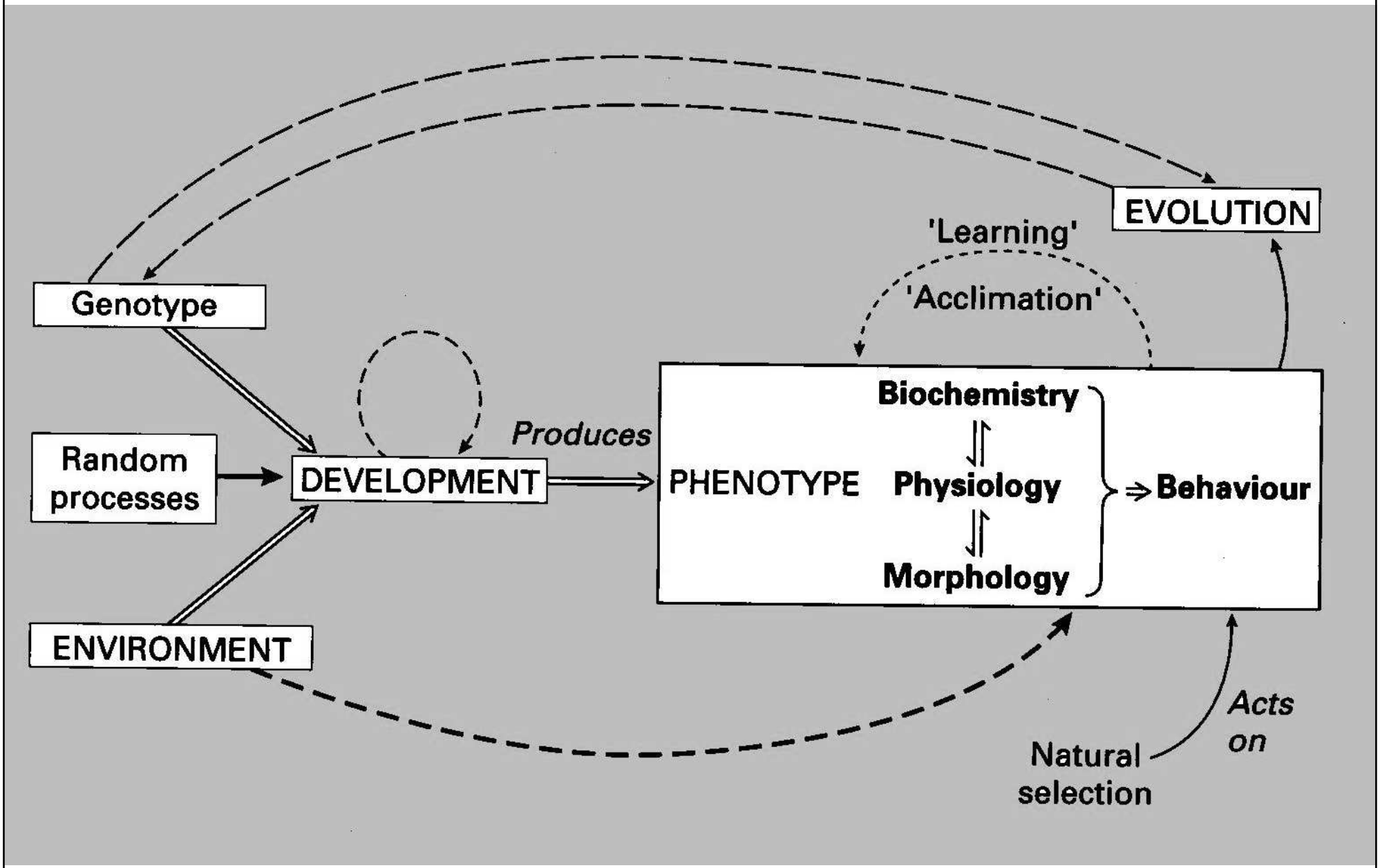
Texty obsahují také některé informace, které na přednáškách nezazní. Je tedy na studentech, aby porovnali tento text s tím co zazní na přednášce.

Dokumenty se zde budou objevovat průběžně, takže zde naleznete dokument vztahující se k nejbližší chystané přednášce.

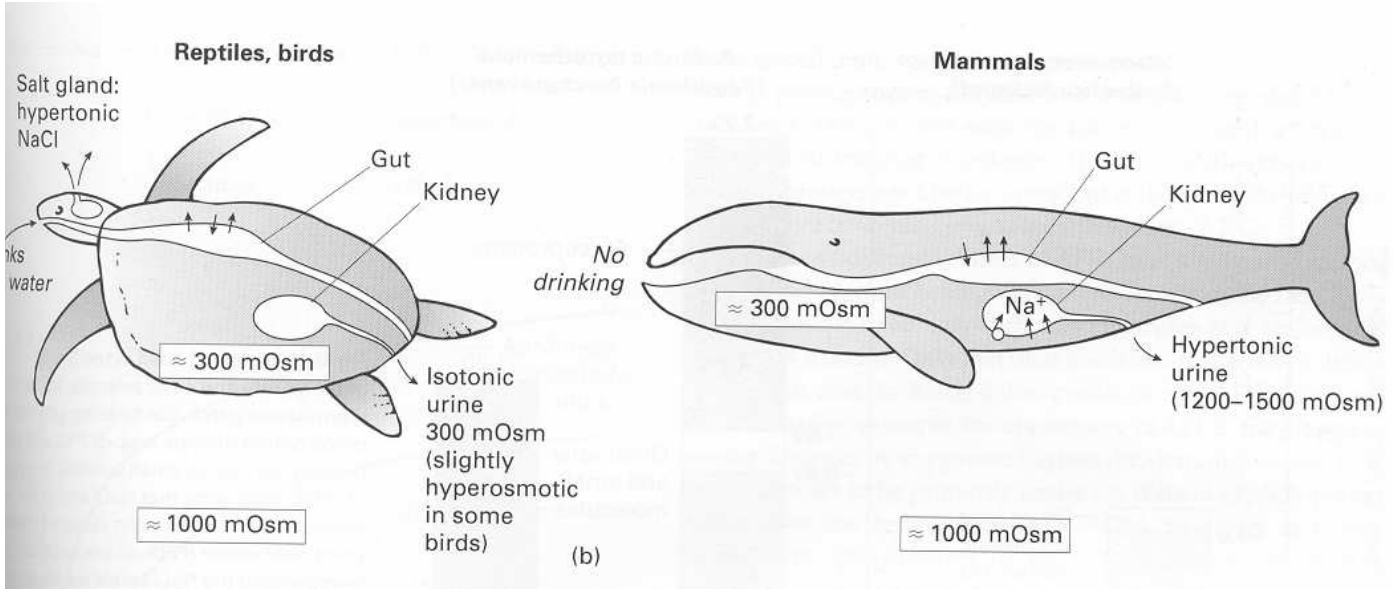
Mějte prosím na paměti, že se nejedná o učebnicový text, ale snahu doktorky Žákovské Vám studentům vyjít vstříc a buďte prosím tolerantní k možným

Přehled kapitol

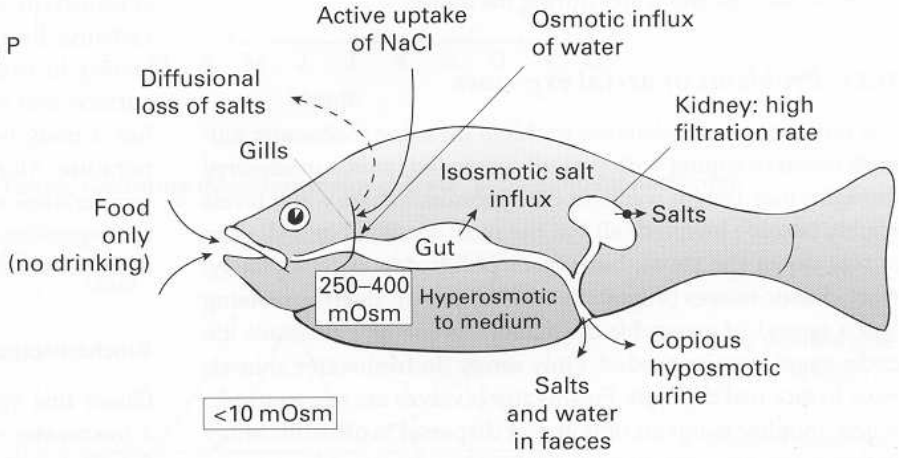
1. POSTAVENÍ FYZIOLOGIE MEZI OSTATNÍMI VĚDAMI
2. FYZIOLOGICKÉ PRINCIPY
3. HOMEOSTÁZA, ADAPTACE A REGULACE
4. OBECNÁ NEUROFYZIOLOGIE
5. PŘEMĚNA LÁTEK A ENERGIÍ – METABOLIZMUS
6. TEPLOTA, JEJÍ VLIV A UDRŽOVÁNÍ
7. PROBLÉM VELIKOSTI A PROPORCÍ TĚLA
8. FYZIOLOGIE POHYBU
9. FUKCE TĚLNÍCH TEKUTIN
10. CIRKULACE
11. FYZIOLOGIE DÝCHACÍHO SYSTÉMU
12. FYZIOLOGIE TRÁVENÍ A VSTŘEBÁVÁNÍ
13. EXKRECE A OSMOREGULACE
14. HORMONÁLNÍ ŘÍZENÍ
15. NERVOVÁ SOUSTAVA
16. SPECIÁLNÍ FYZIOLOGIE SMYSLŮ
17. BIORYTMY


EVOLUTION
'Learning'
'Acclimation'
Genotype
Random processes
ENVIRONMENT
DEVELOPMENT
Produces
PHENOTYPE
Biochemistry
Physiology
Morphology
Behaviour
Natural selection
Acts on

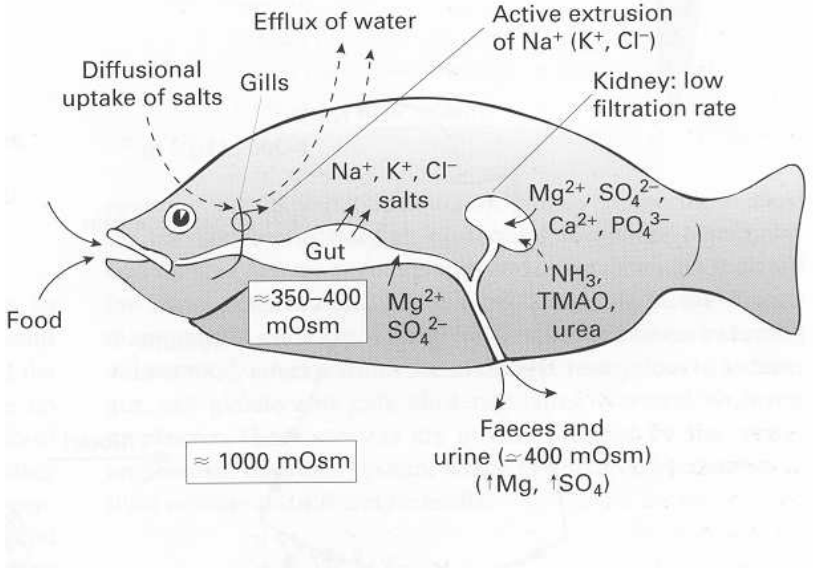
Různé prostředí a různé úkoly při udržování osmolality těla



ve sladké vodě

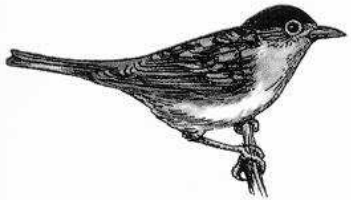


v moři

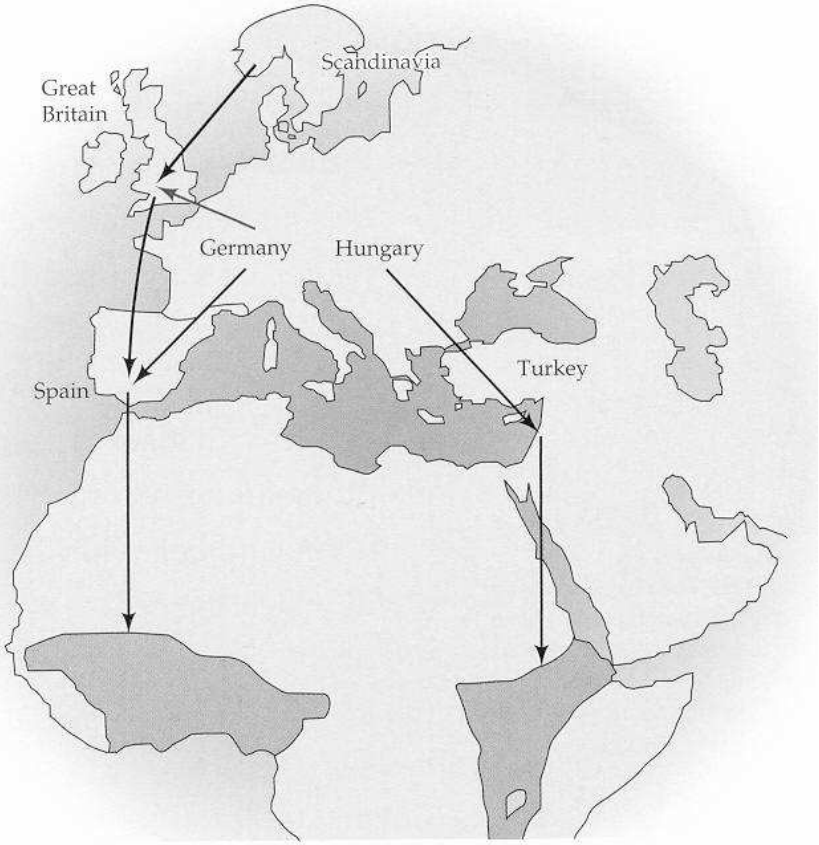


Fenek

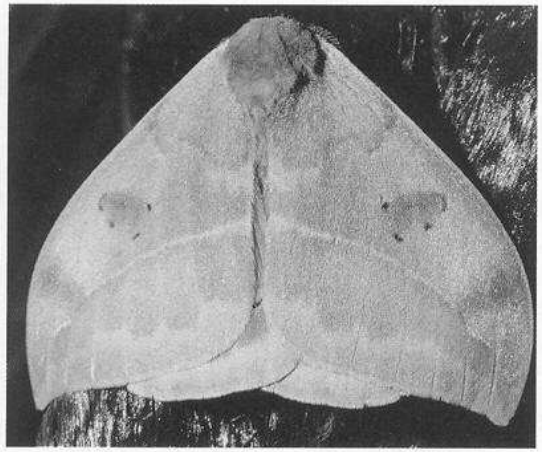
Dobře adaptován na chlad

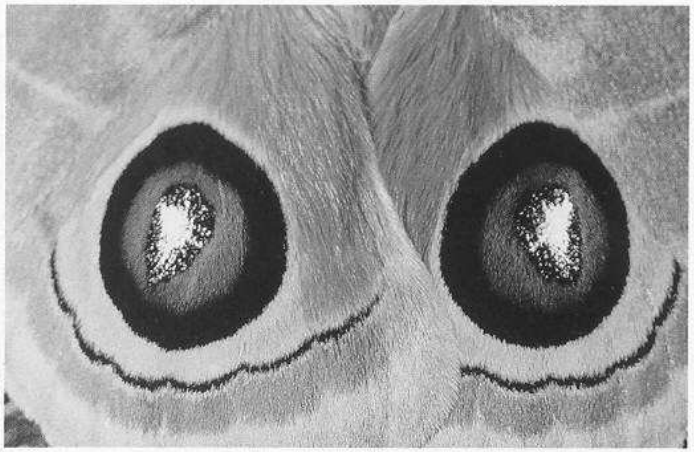


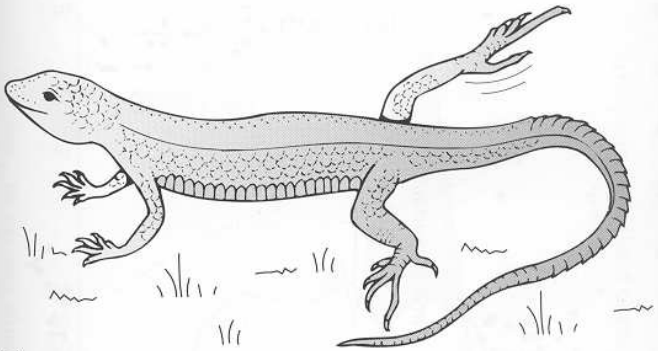
Blackcap warbler



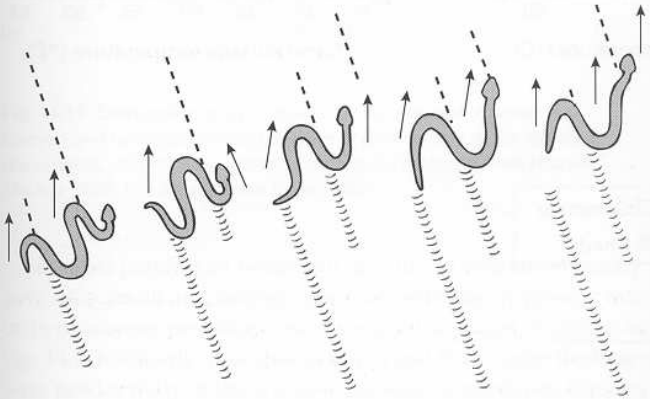
1 Different migratory routes of blackcap warblers. Blackcaps living in southern Germany and Scandinavia first go southwest to Spain before turning south to western Africa. Blackcaps living in eastern Europe go southeast before turning south to fly to eastern Africa. Other members of the species that breed in central Germany fly in a westerly direction to southern Britain, where they remain for the winter.



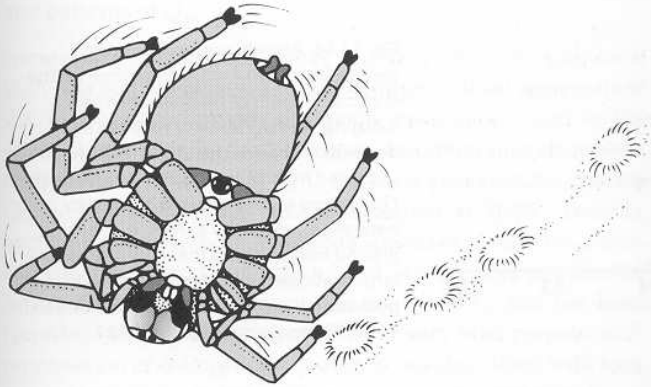




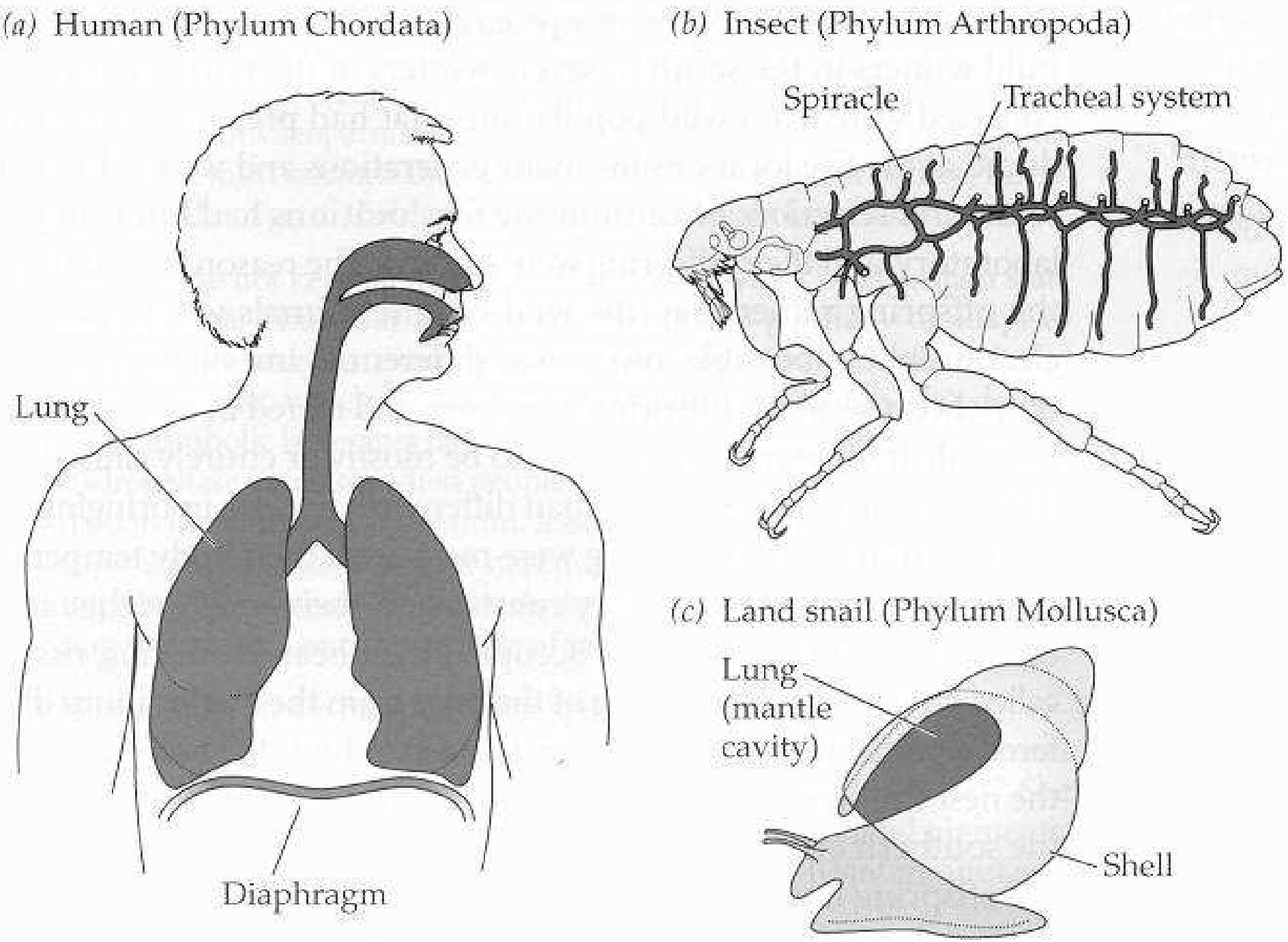
(a)

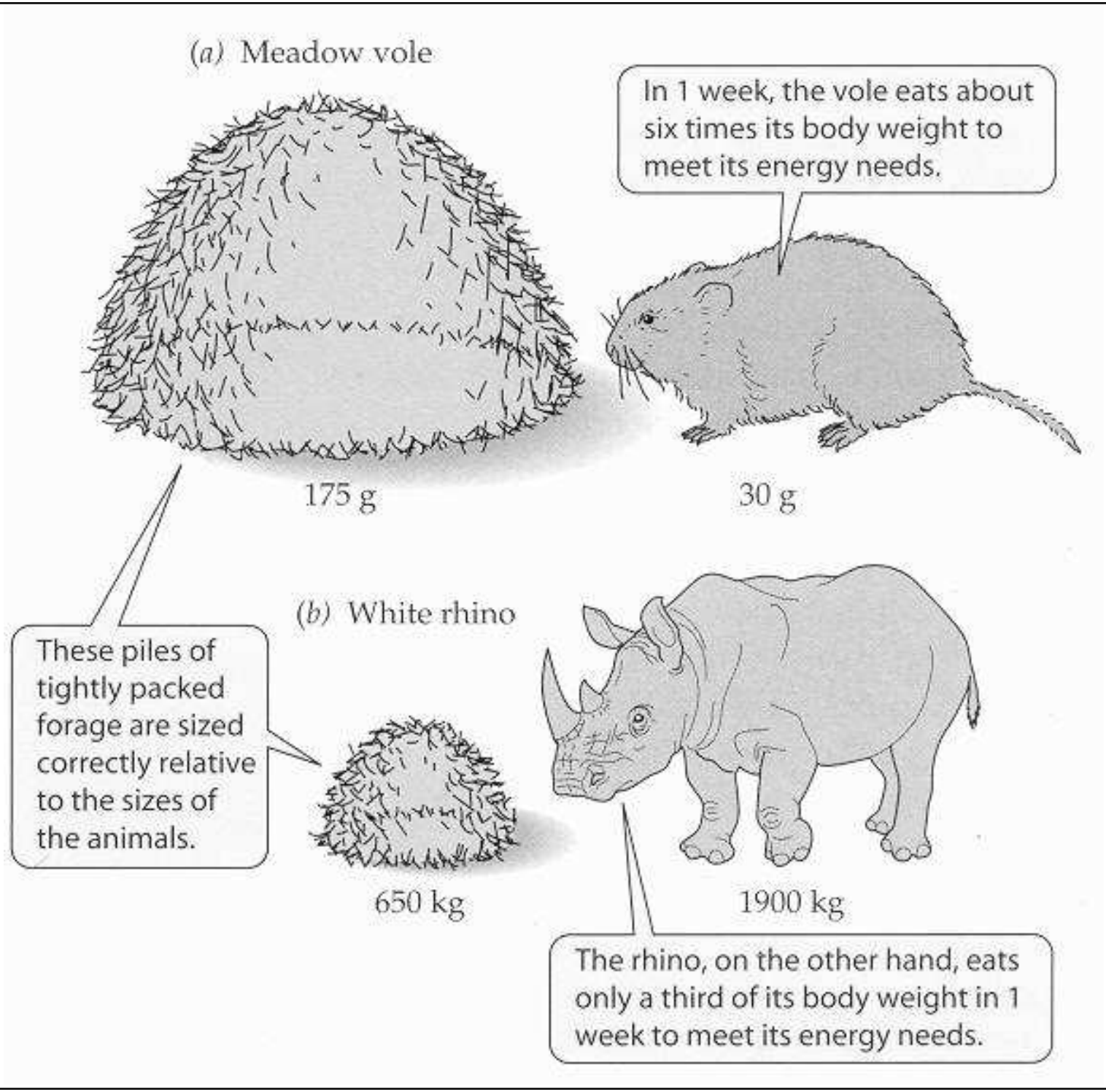


(b)



(c)


(a) Human (Phylum Chordata)
Lung
Diaphragm
(b) Insect (Phylum Arthropoda)
Spiracle
Tracheal system
(c) Land snail (Phylum Mollusca)
Lung
(mantle
cavity)
Shell


(a) Meadow vole
In 1 week, the vole eats about six times its body weight to meet its energy needs.
175 g
30 g
(b) White rhino
These piles of tightly packed forage are sized correctly relative to the sizes of the animals.
650 kg
1900 kg
The rhino, on the other hand, eats only a third of its body weight in 1 week to meet its energy needs.

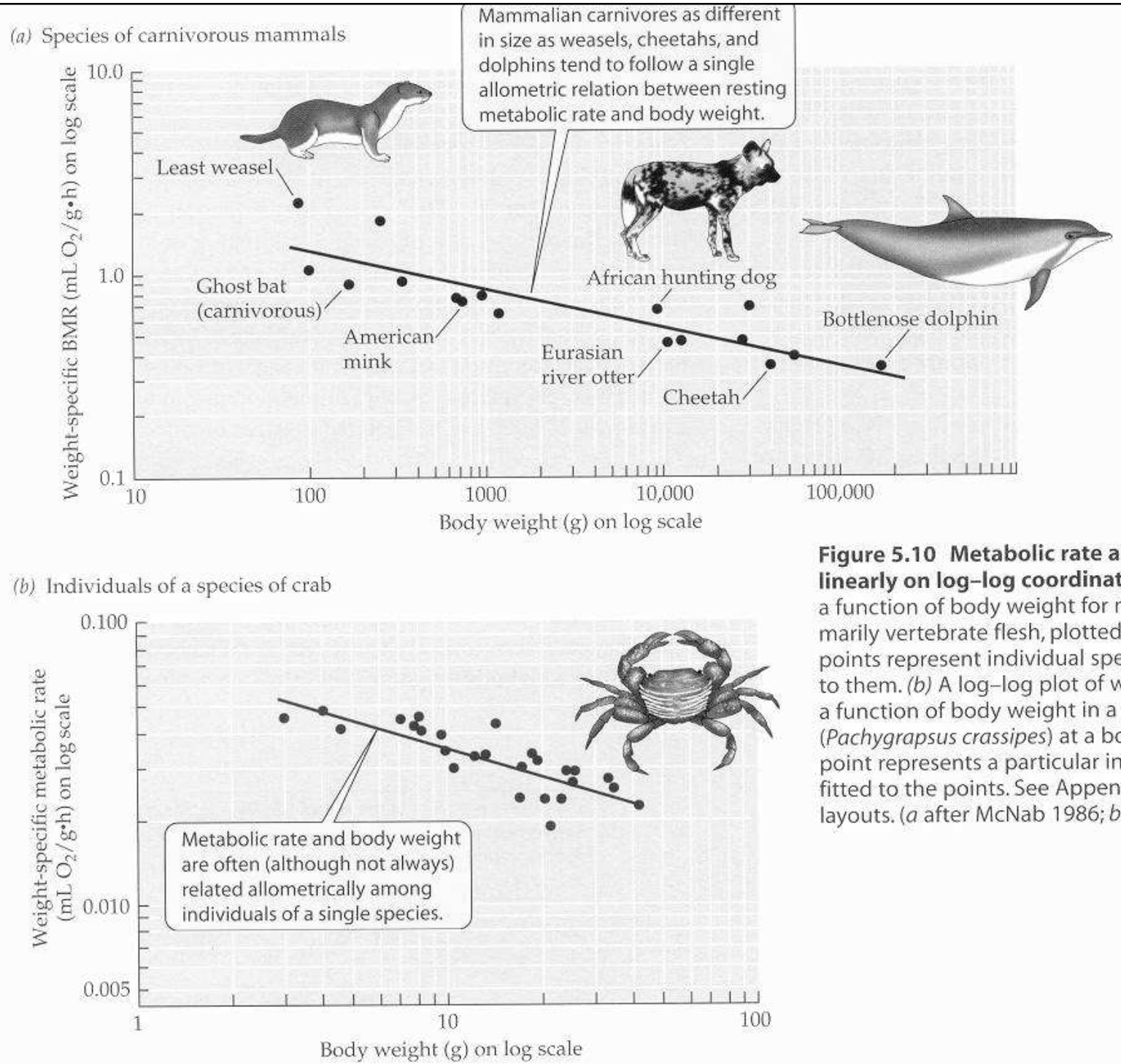
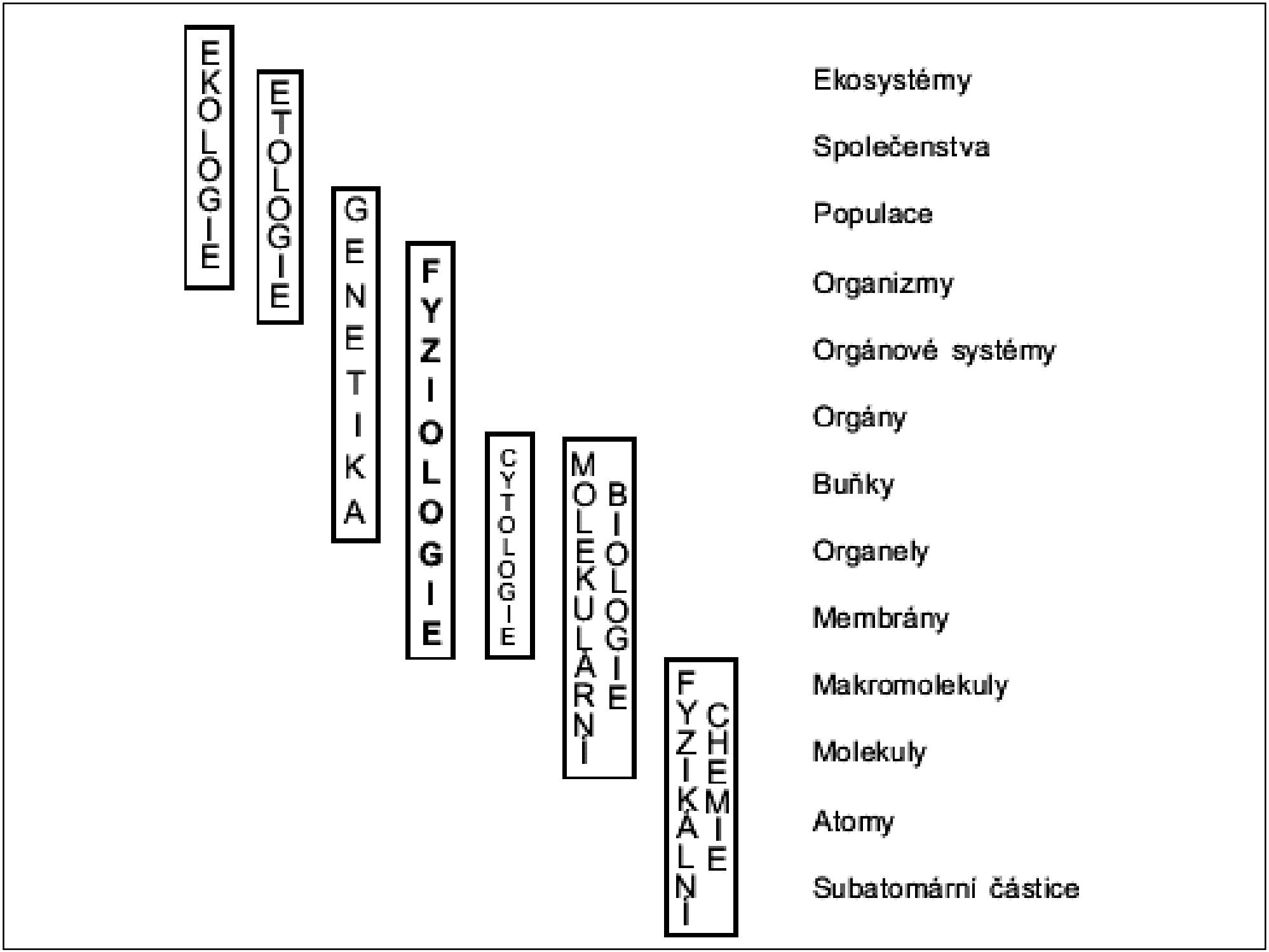
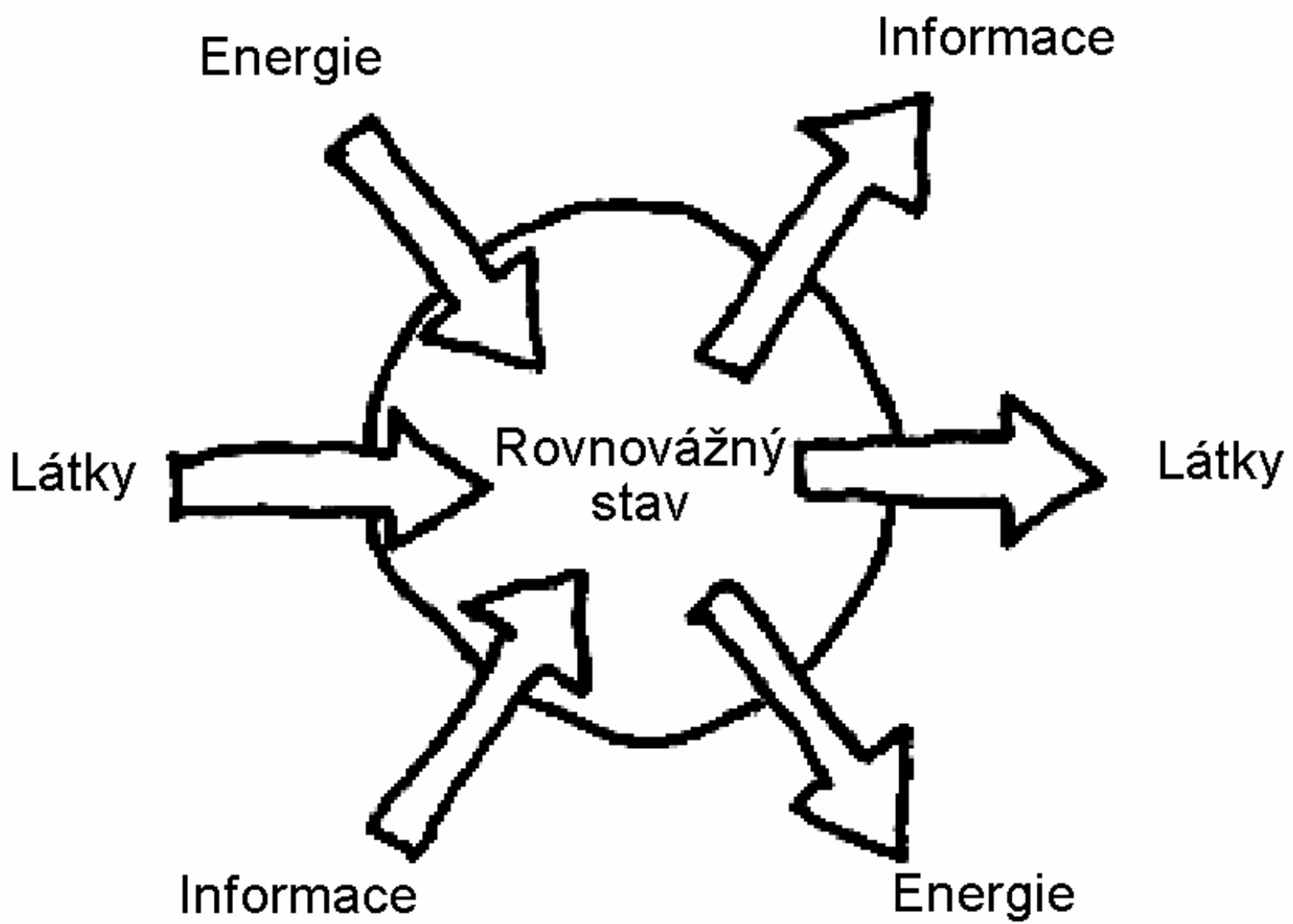


Figure 5.10 Metabolic rate and linearly on log–log coordinates a function of body weight for ma marily vertebrate flesh, plotted o points represent individual speci to them. *(b)* A log–log plot of we a function of body weight in a cc (*Pachygrapsus crassipes*) at a bod point represents a particular indi fitted to the points. See Appendi layouts. (*a* after McNab 1986; *b* a


EKOLOGIE
ETOLOGIE
GENETIKA
FYZIOLOGIE
CYTOLOGIE
MOLEKULÁRNÍ BIOLOGIE
FYZIKÁLNÍ CHEMIE
Ekosystémy
Společenstva
Populace
Organizmy
Orgánové systémy
Orgány
Buňky
Organely
Membrány
Makromolekuly
Molekuly
Atomy
Subatomární částice


Energie
Informace
Látky
Rovnovážný stav
Látky
Informace
Energie

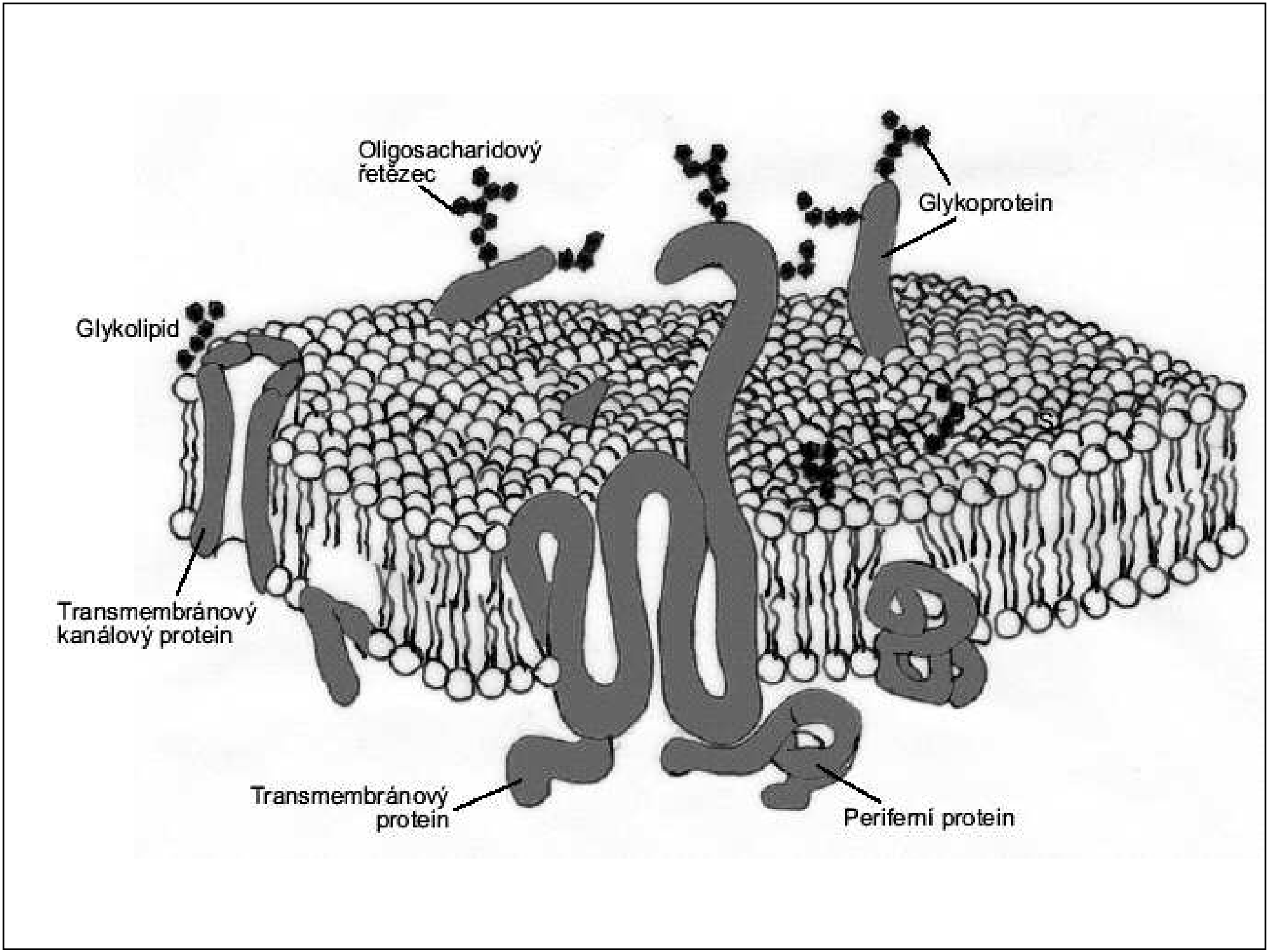
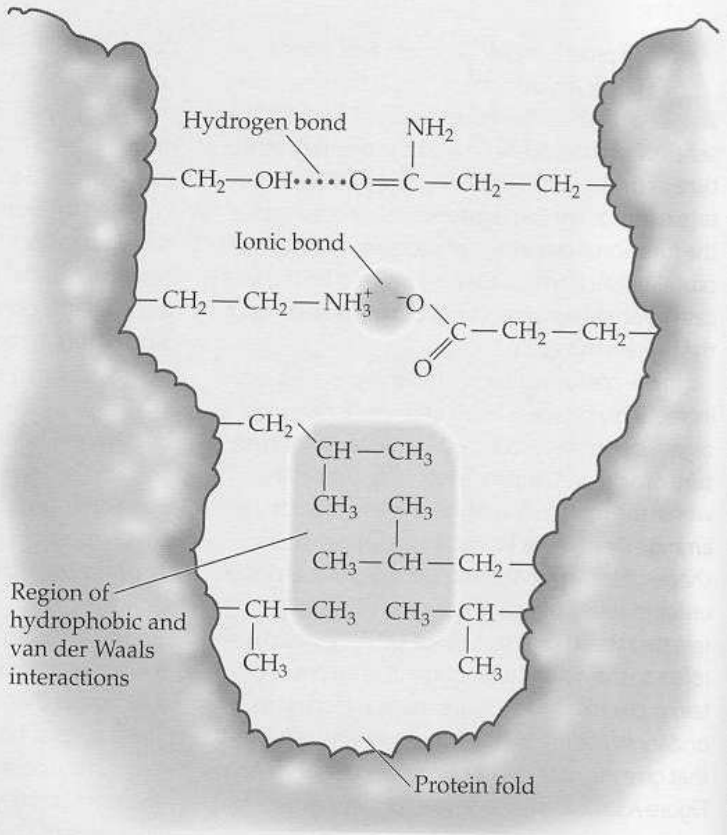
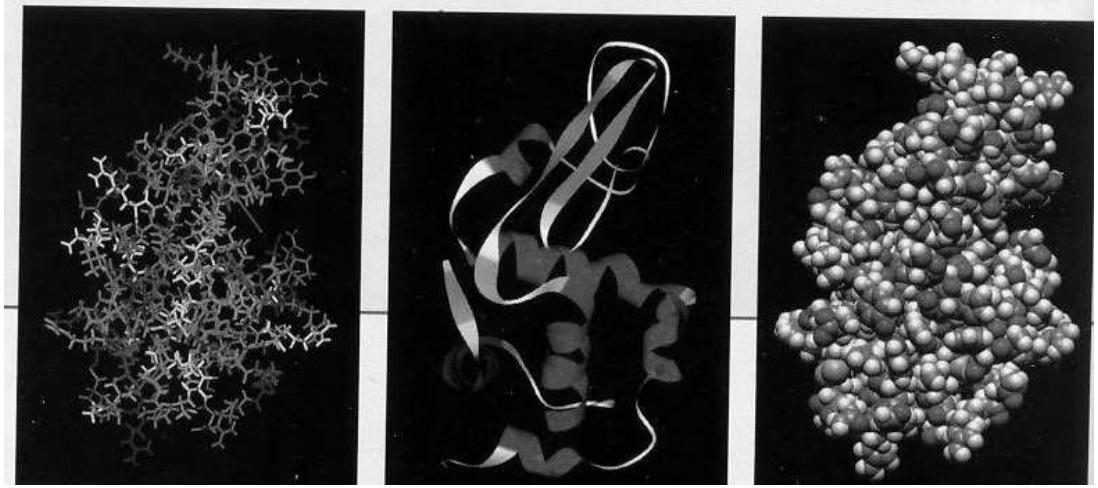

Oligosacharidový
řetězec
Glykoprotein
Glykolipid
Transmembránový
kanálový protein
Transmembránový
protein
Periferní protein

Figure C Types of weak, noncovalent bonds that are important in protein structure The bonds are illustrated where they stabilize a hairpin fold in a protein molecule.

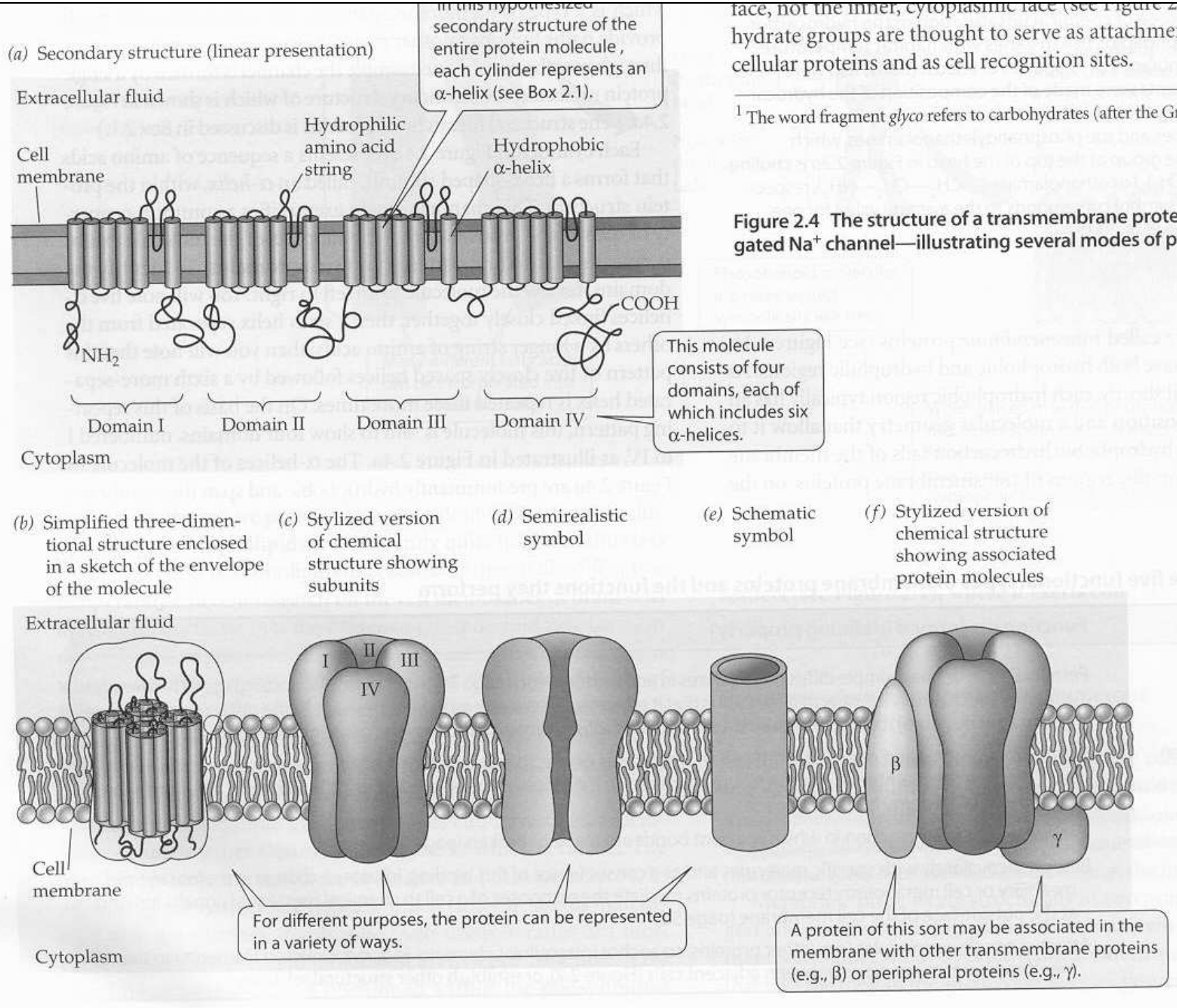




face, not the inner, cytoplasmic face (see Figure 2.1). These carbohydrate groups are thought to serve as attachment sites for extracellular proteins and as cell recognition sites.

[1] The word fragment *glyco* refers to carbohydrates (after the Greek *glykeros*, "sweet")

Figure 2.4 The structure of a transmembrane protein—a voltage-gated Na^+ channel—illustrating several modes of presentation



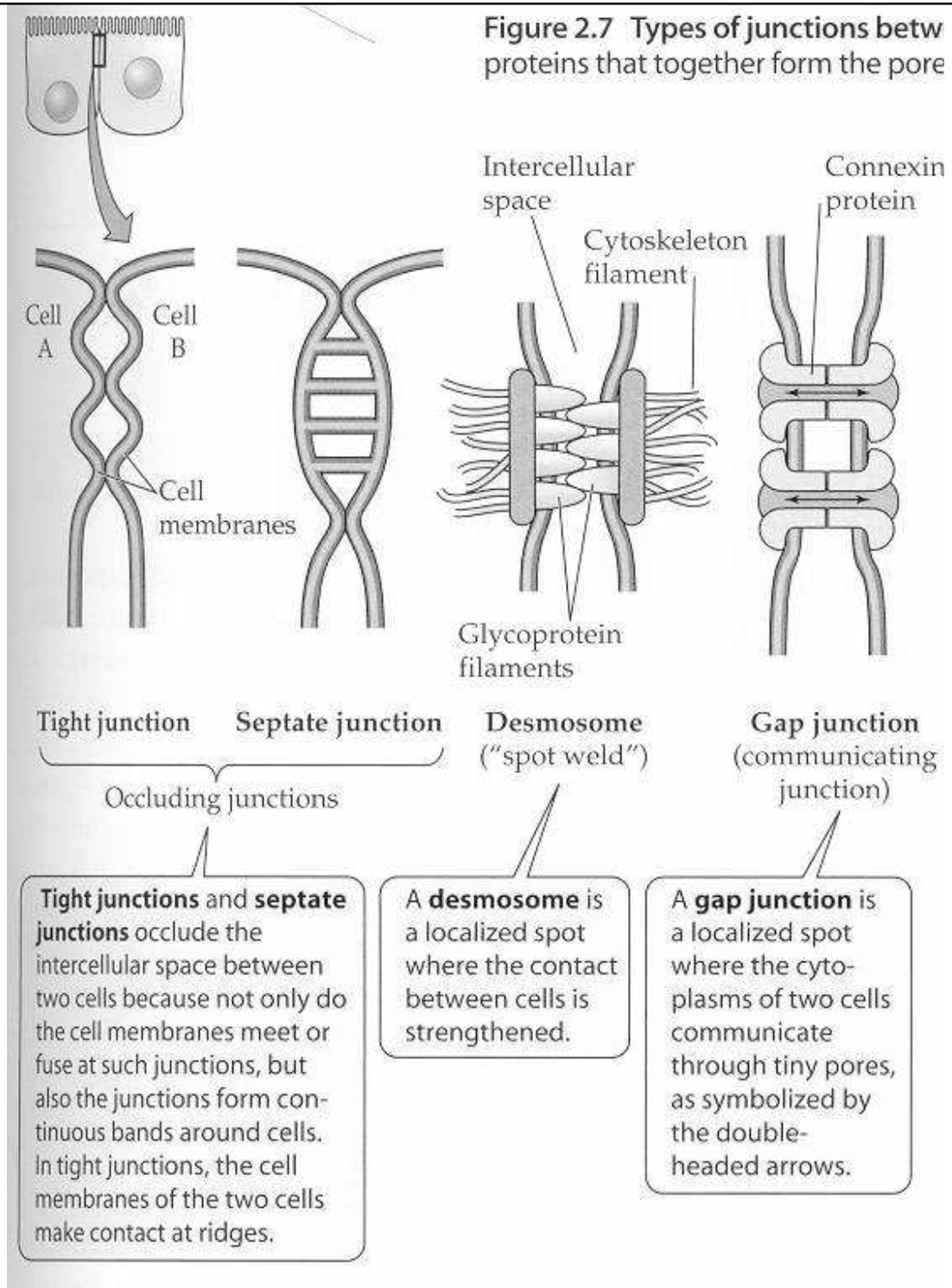
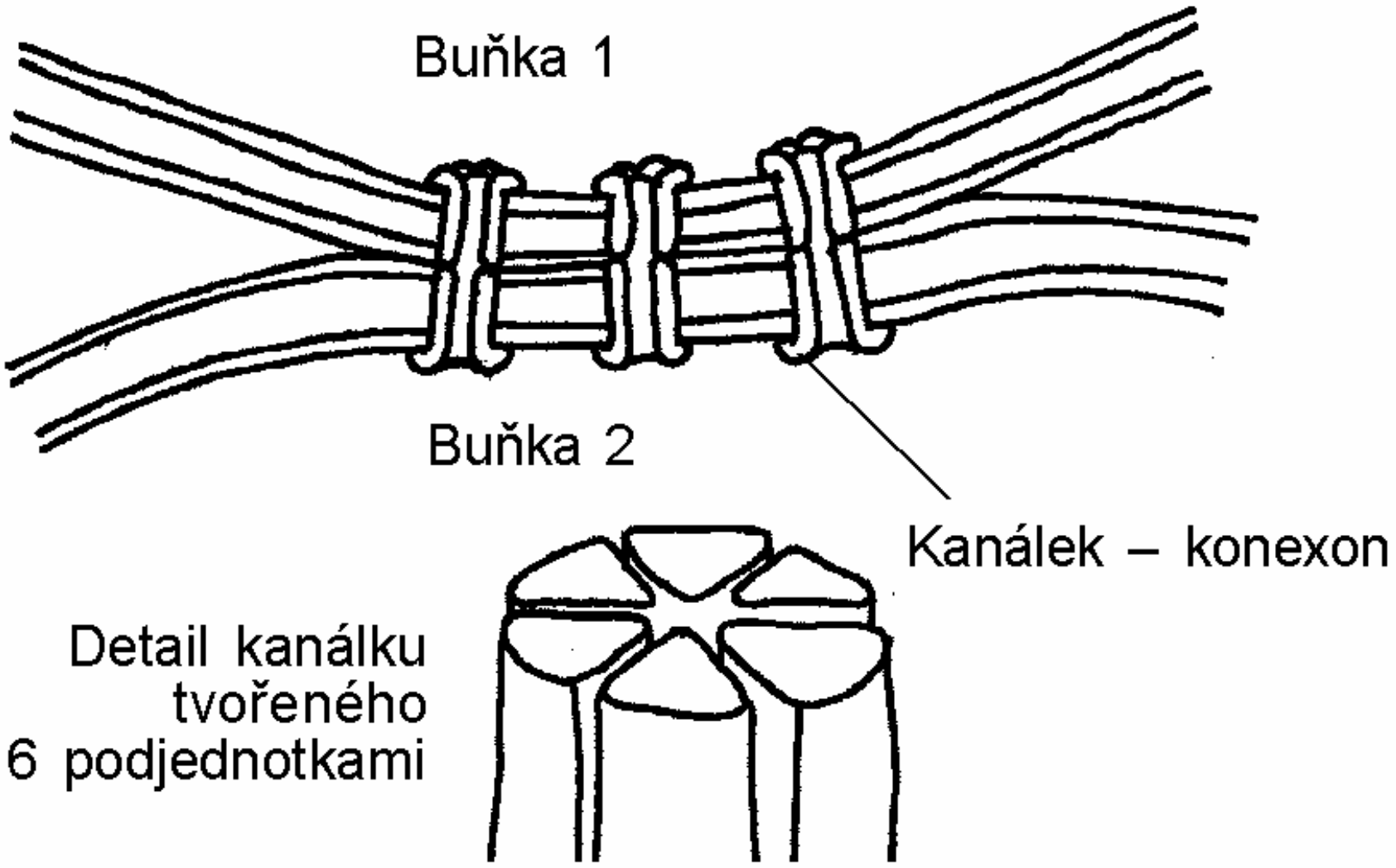
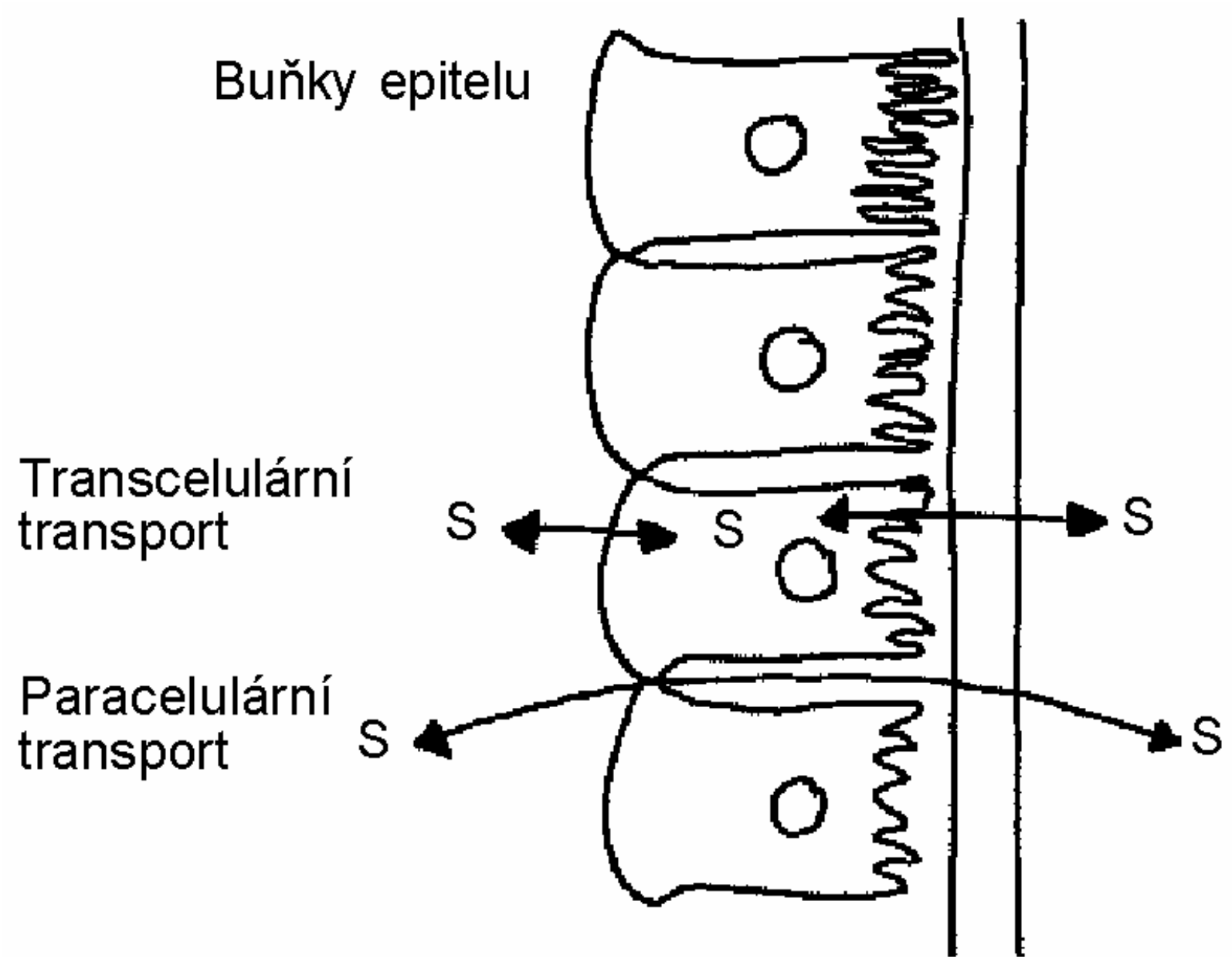
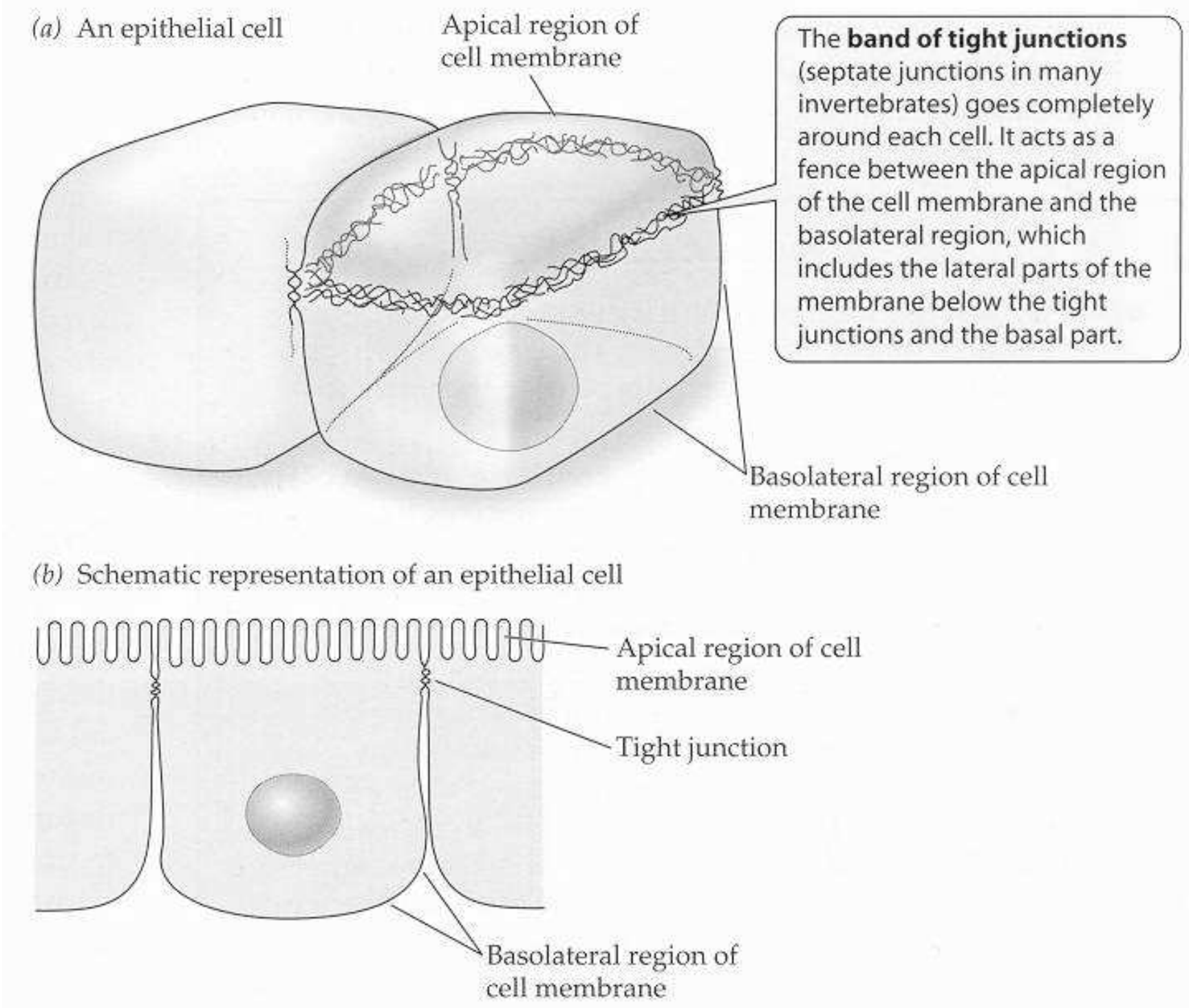
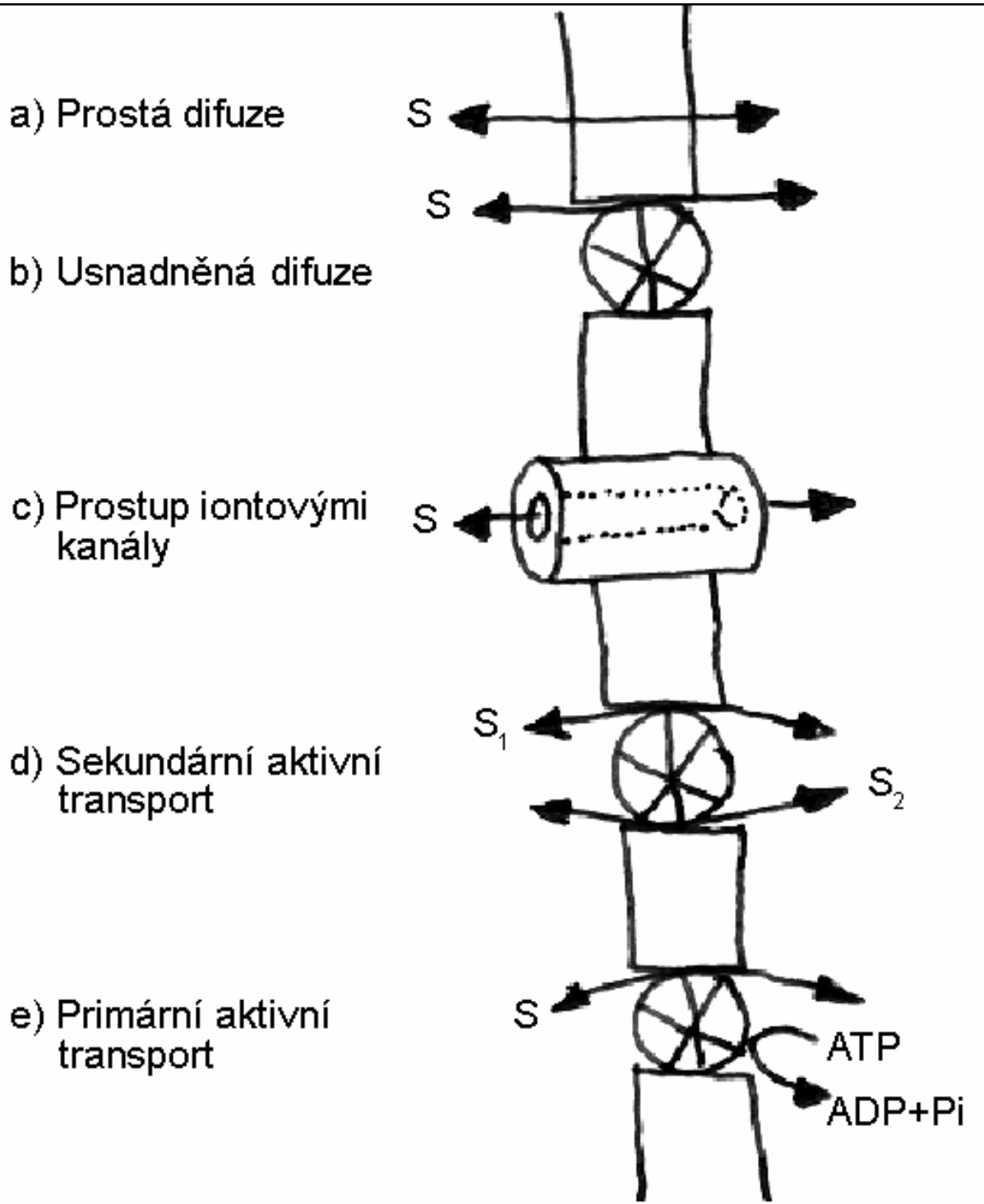


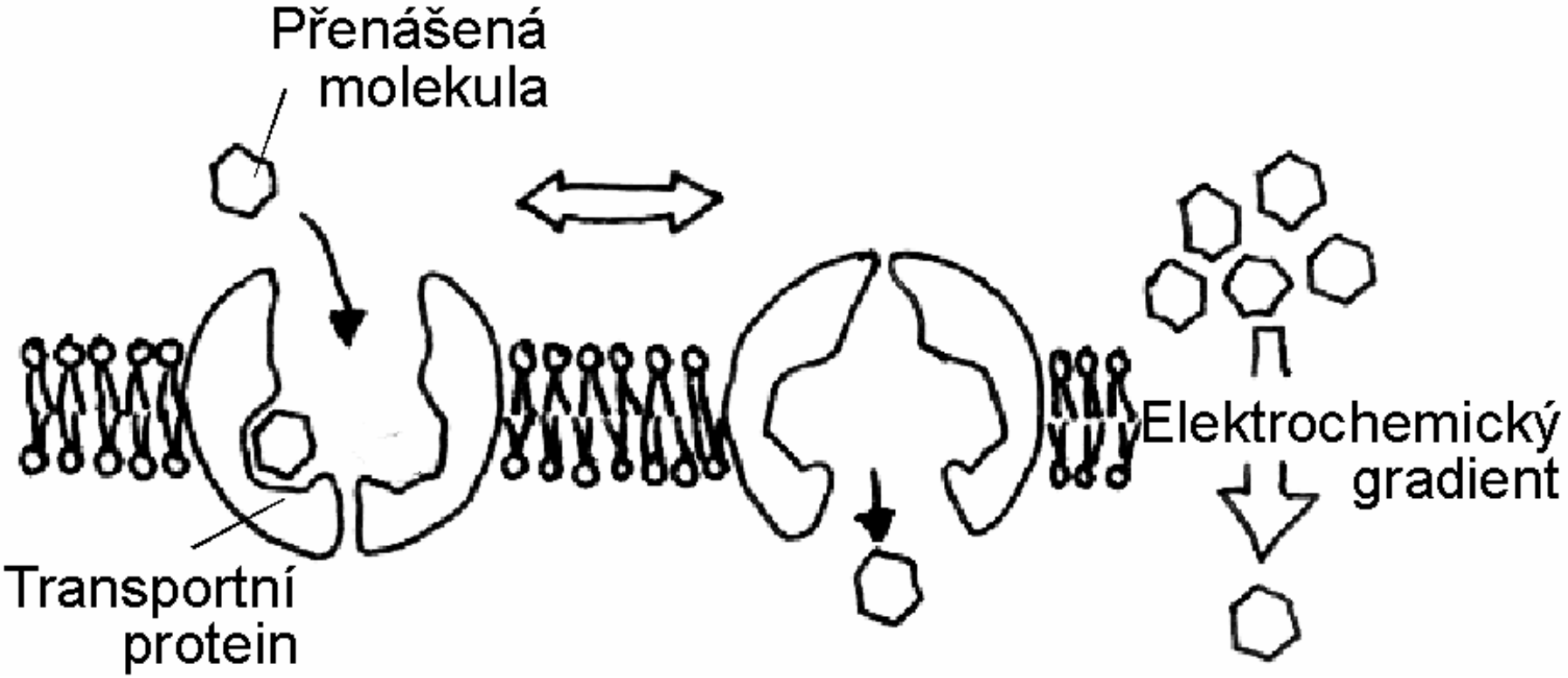
Figure 2.7 Types of junctions betw
proteins that together form the pore
Intercellular space
Connexin protein
Cytoskeleton filament
Cell A
Cell B
Cell membranes
Glycoprotein filaments
Tight junction
Septate junction
Desmosome ("spot weld")
Gap junction (communicating junction)
Occluding junctions
Tight junctions and septate junctions occlude the intercellular space between two cells because not only do the cell membranes meet or fuse at such junctions, but also the junctions form continuous bands around cells. In tight junctions, the cell membranes of the two cells make contact at ridges.
A desmosome is a localized spot where the contact between cells is strengthened.
A gap junction is a localized spot where the cytoplasms of two cells communicate through tiny pores, as symbolized by the double-headed arrows.

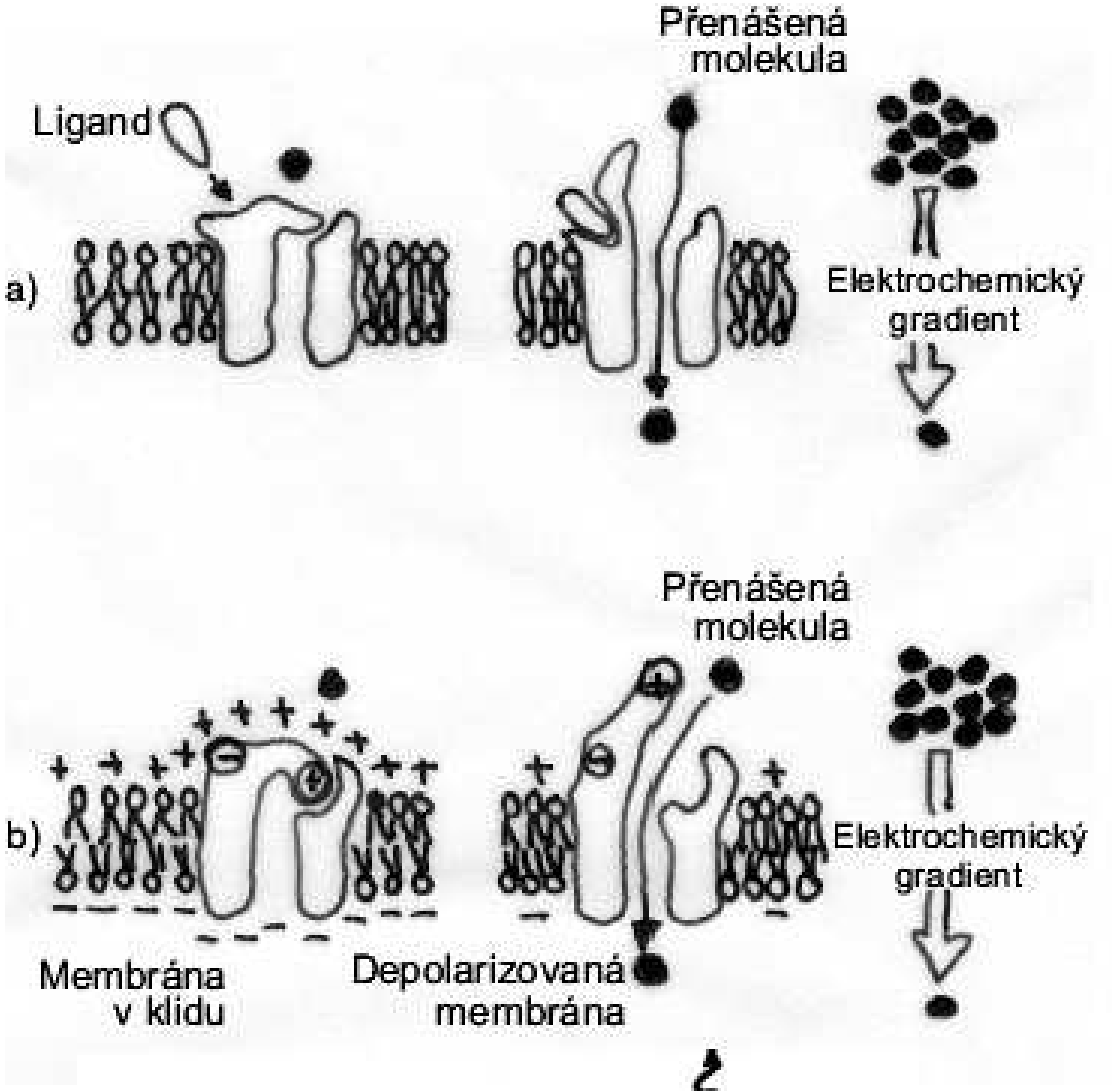

Buňka 1
Buňka 2
Kanálek – konexon
Detail kanálku tvořeného 6 podjednotkami

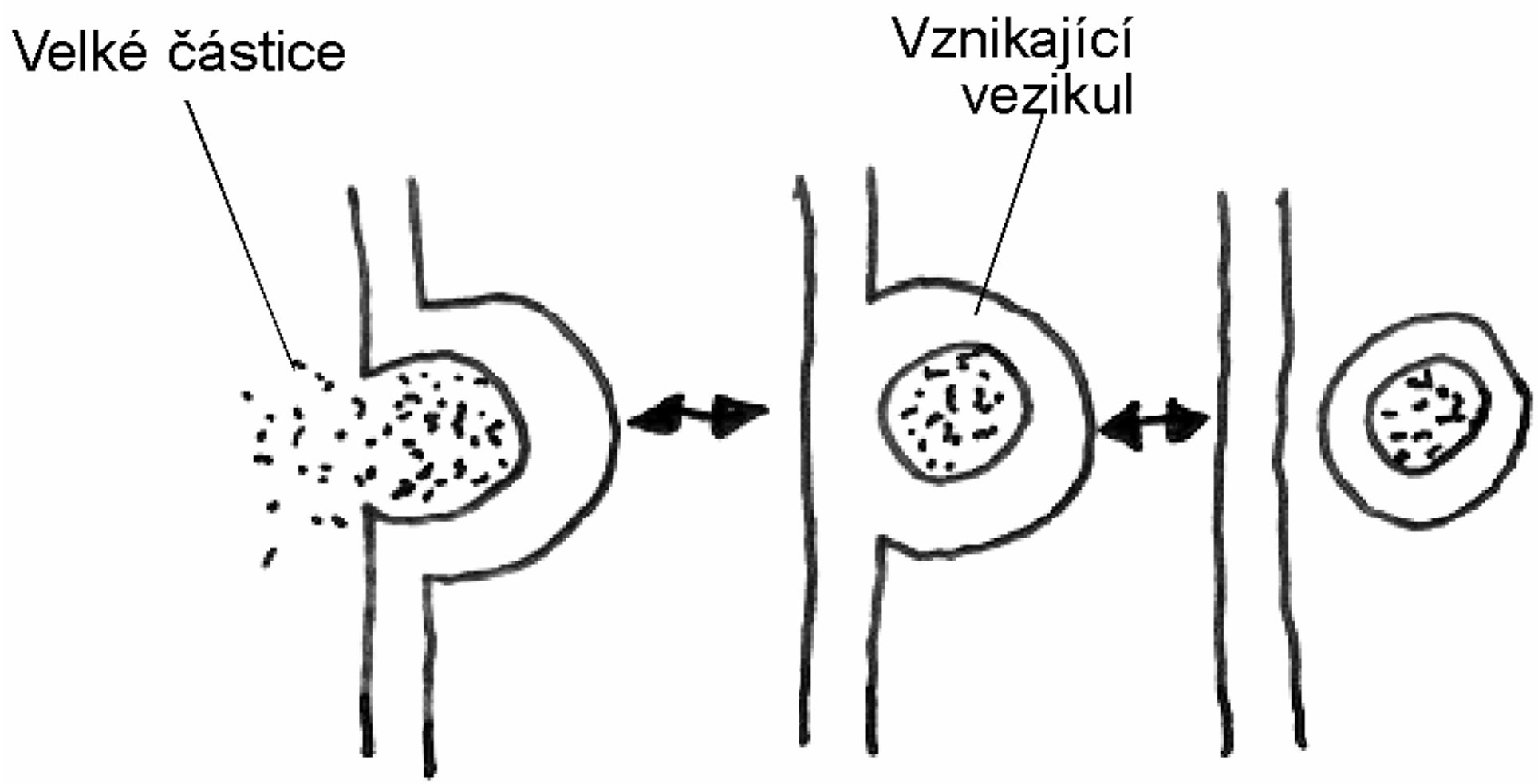

Buňky epitelu
Transcelulární transport
S
S
S
Paracelulární transport
S
S


(a) An epithelial cell
Apical region of cell membrane
The band of tight junctions (septate junctions in many invertebrates) goes completely around each cell. It acts as a fence between the apical region of the cell membrane and the basolateral region, which includes the lateral parts of the membrane below the tight junctions and the basal part.
Basolateral region of cell membrane
(b) Schematic representation of an epithelial cell
Apical region of cell membrane
Tight junction
Basolateral region of cell membrane

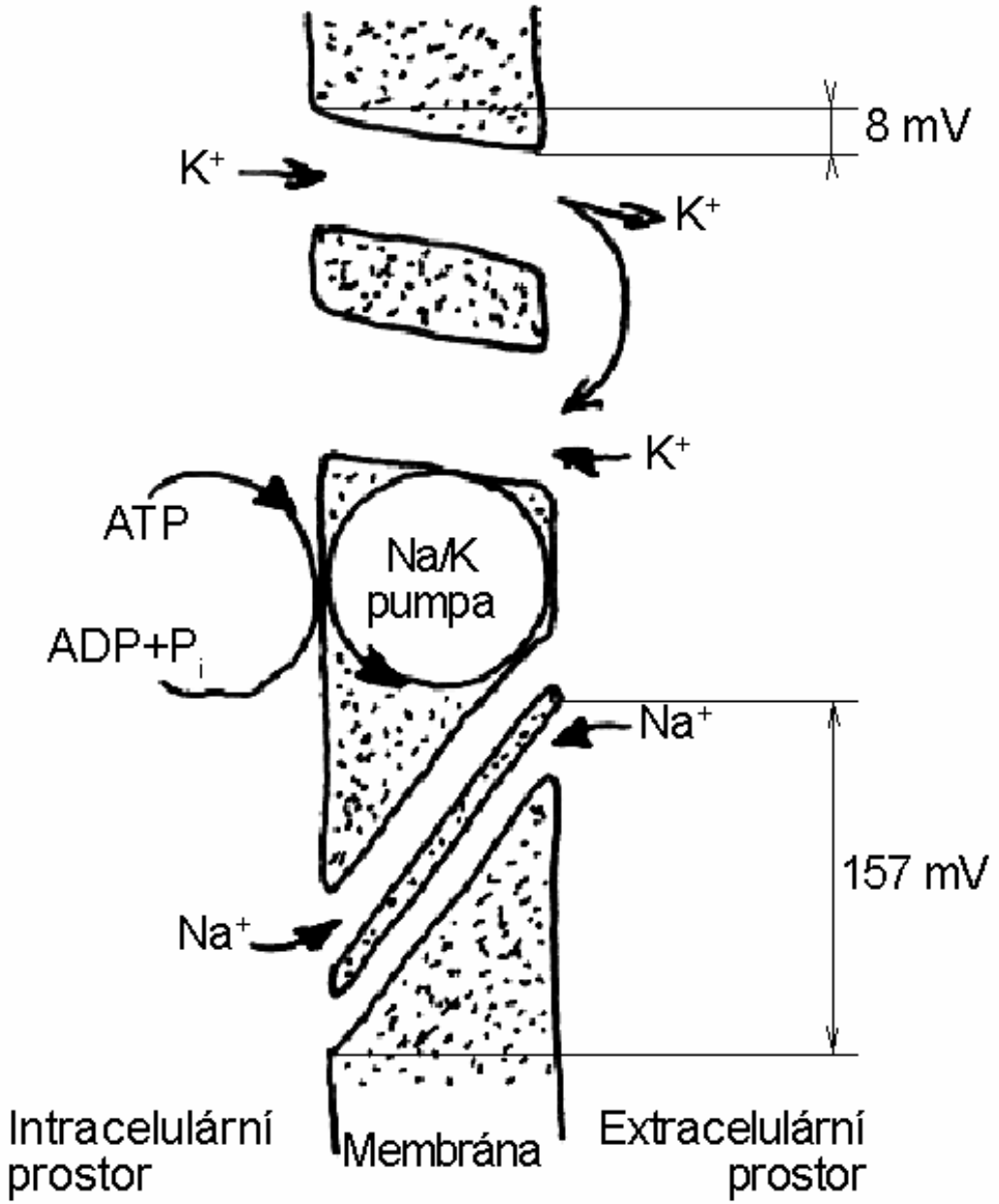

a) Prostá difuze
S
S
b) Usnadněná difuze
c) Prostup iontovými kanály
S
d) Sekundární aktivní transport
S_1
S_2
e) Primární aktivní transport
S
ATP
ADP+Pi

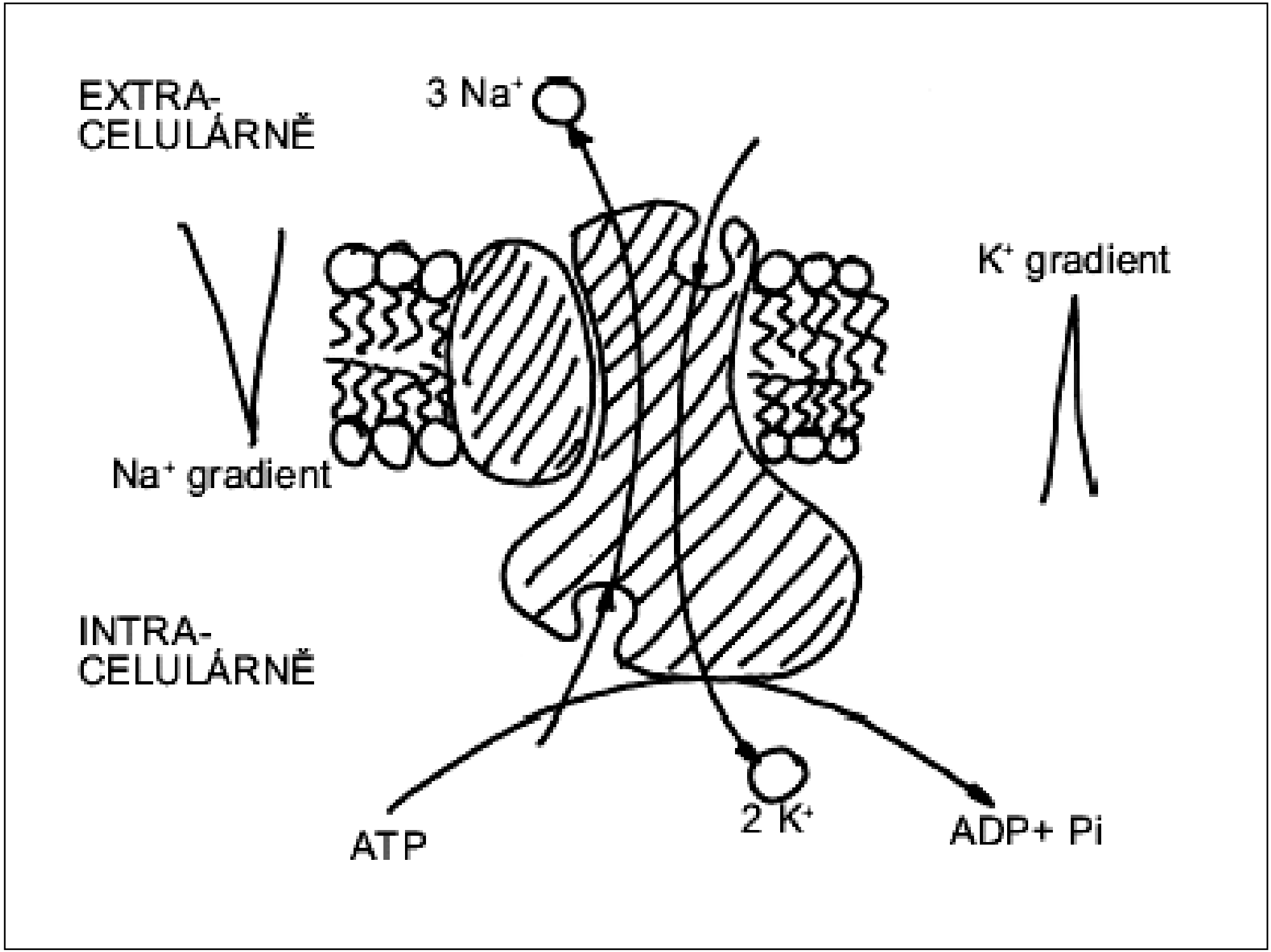

Přenášená
molekula
Elektrochemický
gradient
Transportní
protein

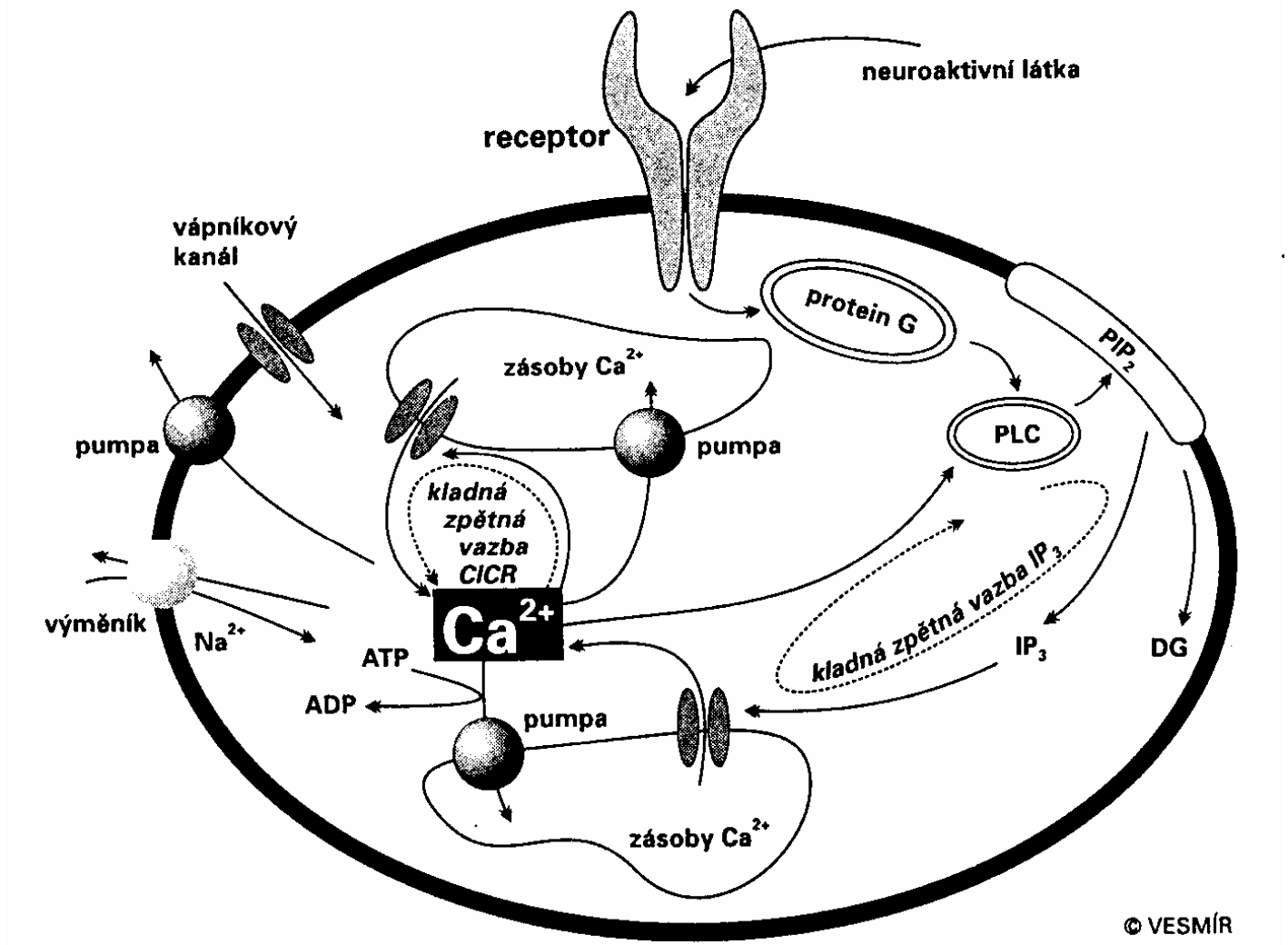

Přenášená
molekula
Ligand
a)
Elektrochemický
gradient
Přenášená
molekula
b)
Elektrochemický
gradient
Membrána
v klidu
Depolarizovaná
membrána
c)


Velké částice
Vznikající
vezikul

Iont	Koncentrace		Gradient Intra/Extra	Rovnovážný potenciál
	Intracelulární	Extracelulární		
Na^+	12 mmol/l	145 mmol/l	1:12	+67 mV
K^+	155 mmol/l	4 mmol/l	39:1	-98 mV
Cl^-	4 mmol/l	123 mmol/l	1:31	-90 mV
volný Ca^{2+}	10^{-4} mmol/l	1,5 mmol/l	1:15.000	+129 mV
fixní anionty	155 mmol/l			


8 mV
K+
K+
K+
ATP
ADP+Pi
Na/K
pumpa
Na+
Na+
157 mV
Intracelulární
prostor
Membrána
Extracelulární
prostor


EXTRA-
CELULÁRNĚ
3 Na+
K+ gradient
Na+ gradient
INTRA-
CELULÁRNĚ
2 K+
ATP
ADP+ Pi

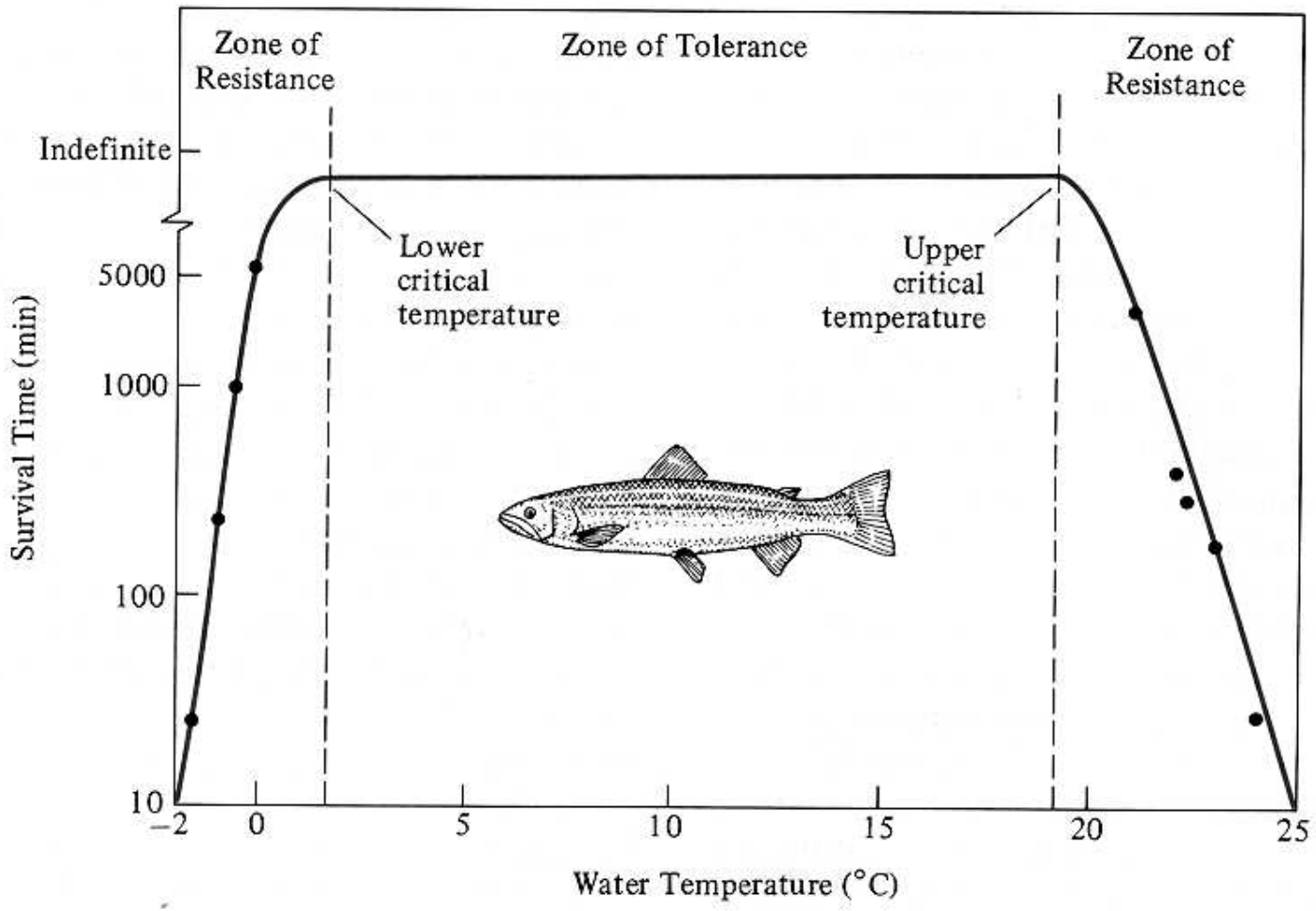


Mechanizmy regulující v buňce koncentraci vápníku: PLC – fosfolipáza C, DG – diacylglycerol, CICR – indukované uvolňování vápníku

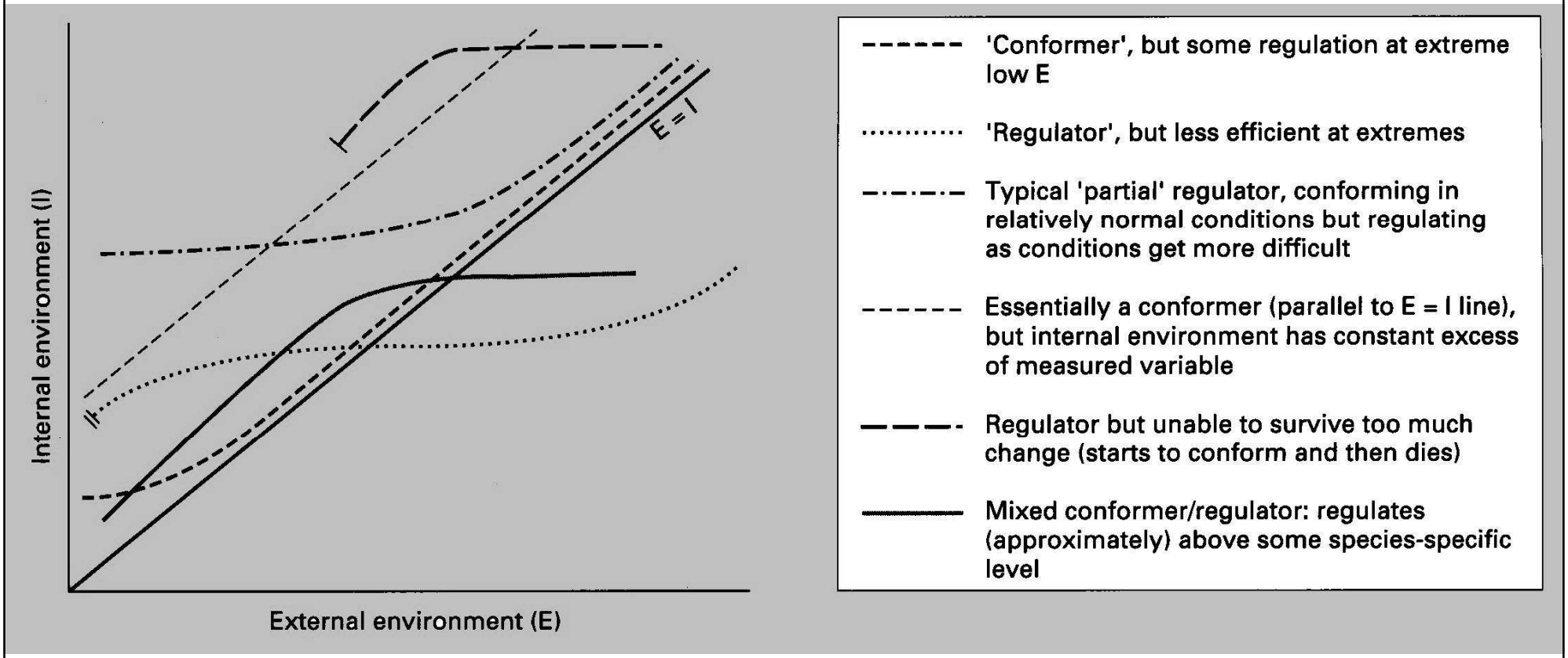
prokázat,
kem. (viz
Mnoho

Homeostáza, adaptace, regulace

Optimum a jeho hranice



	r-selection	*K*-selection	A-selection
Environment			
Stability	Low	High	High
Abiotic stress	High	Low	High
Energy	Low	High	Low
Individuals			
Body size	Small	Large	Small *or* large
Lifespan	Short	Long	Long
Maturity	Early	Late	Late
Reproduction			
Pattern	Semelparous	Iteroparous	Either
Generation time	Short	Long	Either
Fecundity	High	Low	Low
Offspring	Many, small	Few, large	Either
Parental care	Absent	Common	Possible
Populations			
Density	Fluctuating	High	Low, or fluctuating
Stability	Fluctuating	Steady	Fluctuating
Range	High	Low	Either
Competition	Low	High	Low
Biotic interactions	Few, simple	Many, complex	Few, simple
Overview	Small	Large	Very varied
	Rapid reproductive output	Slow reproductive output	Usually slow
	Colonists	Climax communities	Simple climax
	Generalists	Specialists	Specialists


Internal environment (I)
External environment (E)
E = I
'Conformer', but some regulation at extreme low E
'Regulator', but less efficient at extremes
Typical 'partial' regulator, conforming in relatively normal conditions but regulating as conditions get more difficult
Essentially a conformer (parallel to E = I line), but internal environment has constant excess of measured variable
Regulator but unable to survive too much change (starts to conform and then dies)
Mixed conformer/regulator: regulates (approximately) above some species-specific level

(a) Temperature conformity

When a salmon enters a river from the sea, its body temperature (including blood temperature) changes if the river water is warmer or cooler than the ocean water…

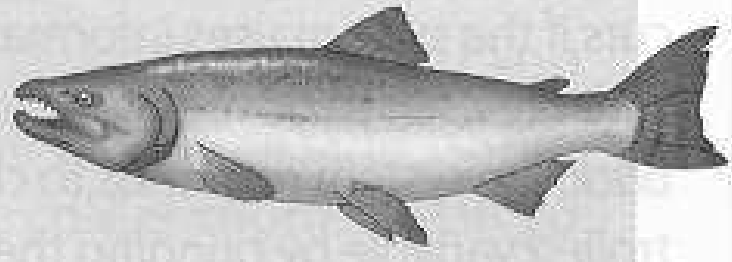
Blood temperature

Water temperature

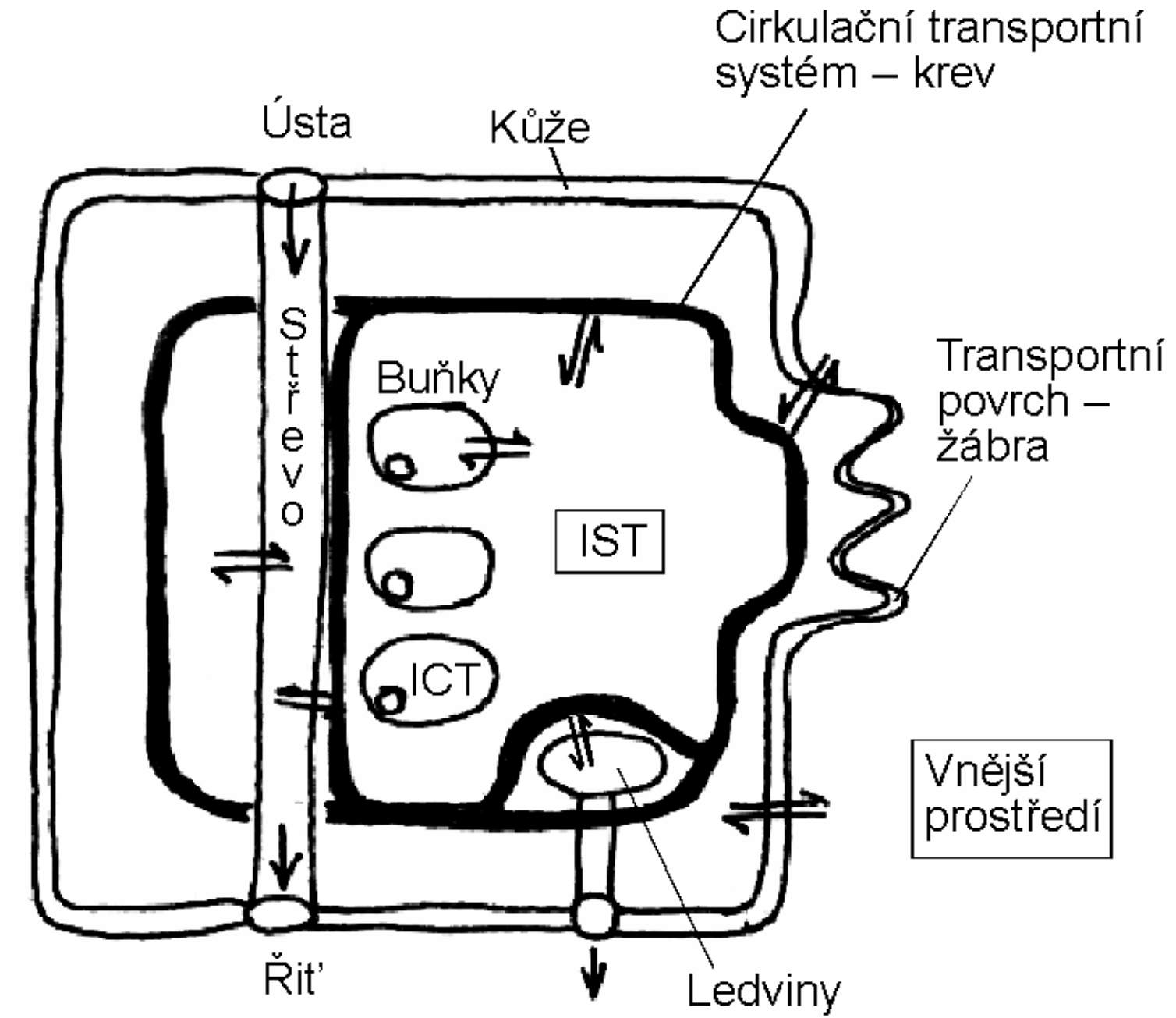
(b) Chloride regulation

…but its blood Cl^- concentration remains almost constant, even though river water is very dilute in Cl^- and seawater is very concentrated in Cl^-.

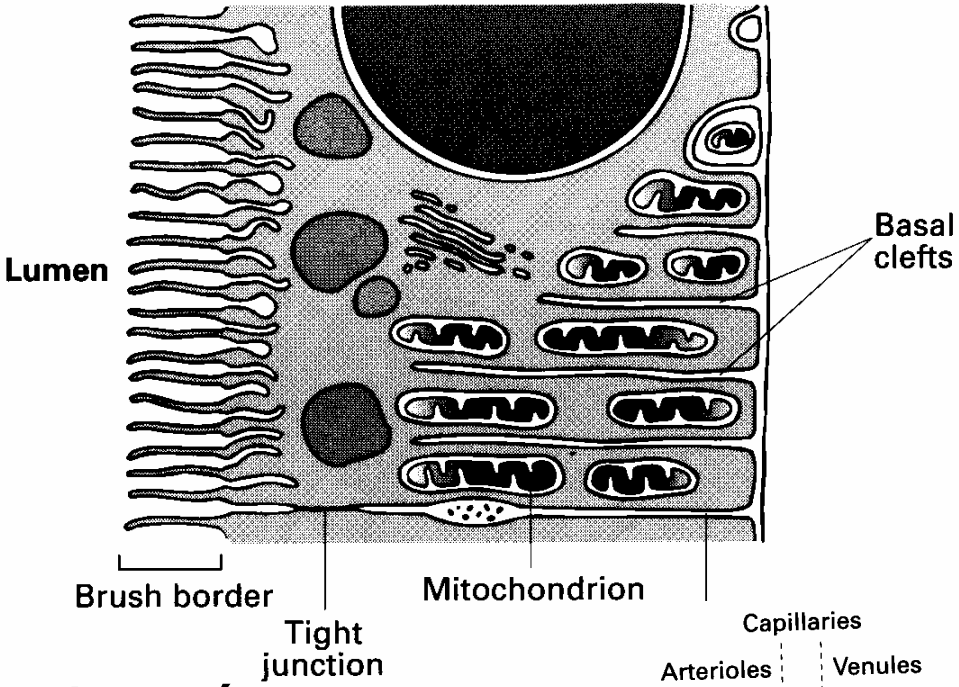
Blood Cl^- concentration



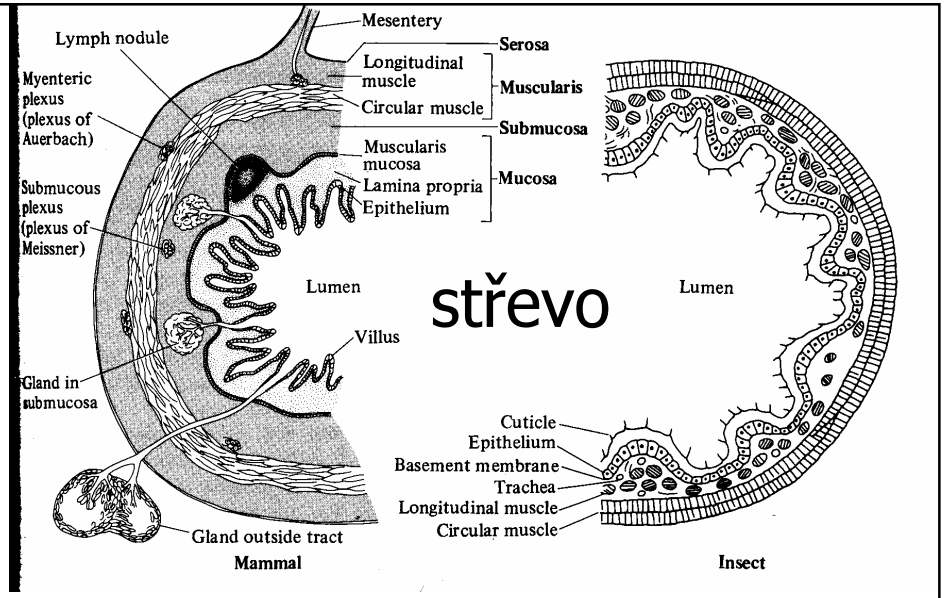
Water Cl^- concentration


Cirkulační transportní systém – krev
Ústa
Kůže
Střevo
Buňky
IST
ICT
Transportní povrch – žábra
Vnější prostředí
Řiť
Ledviny

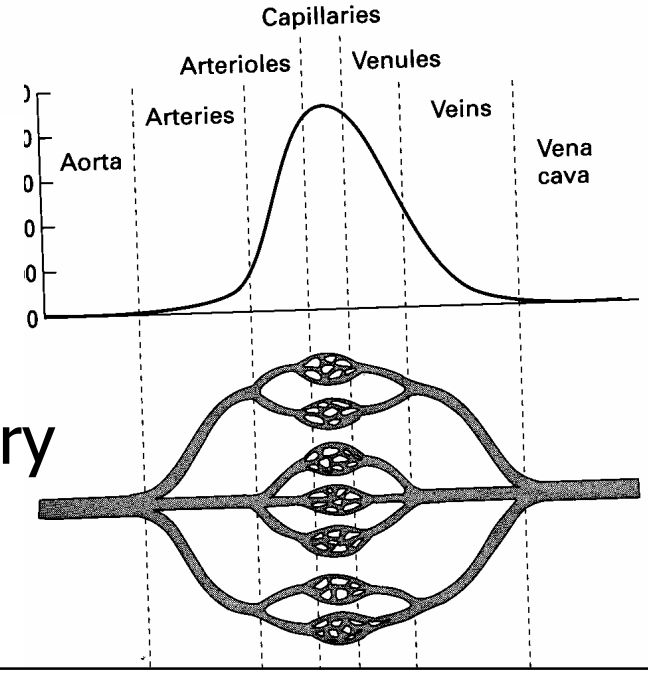
Kontaktní rozhraní musí mít velkou plochu



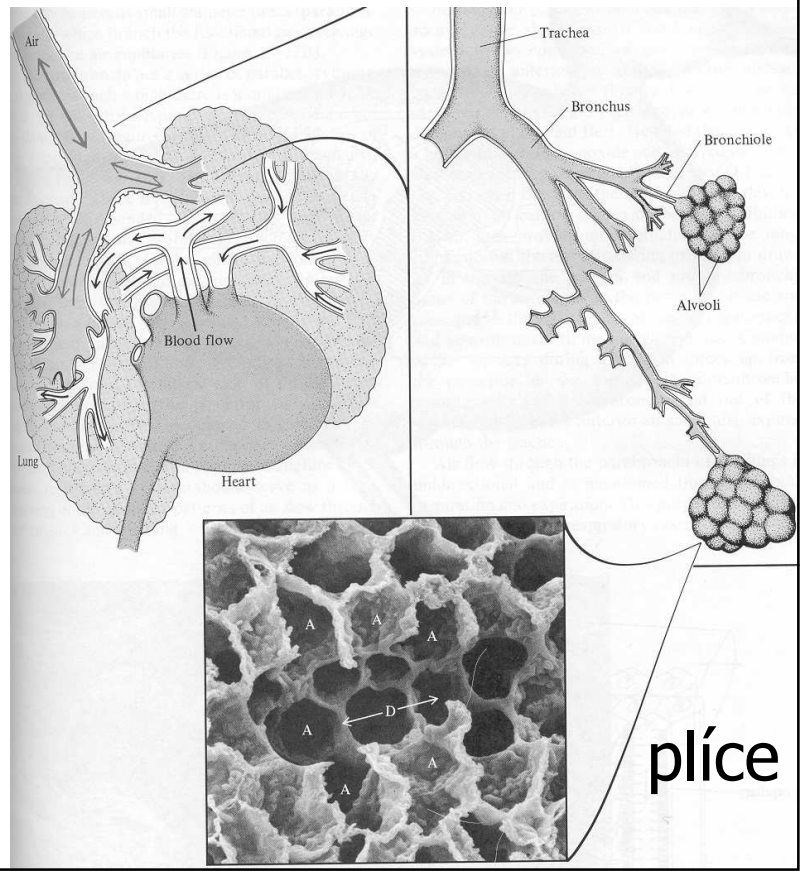
ledvinný tubulus



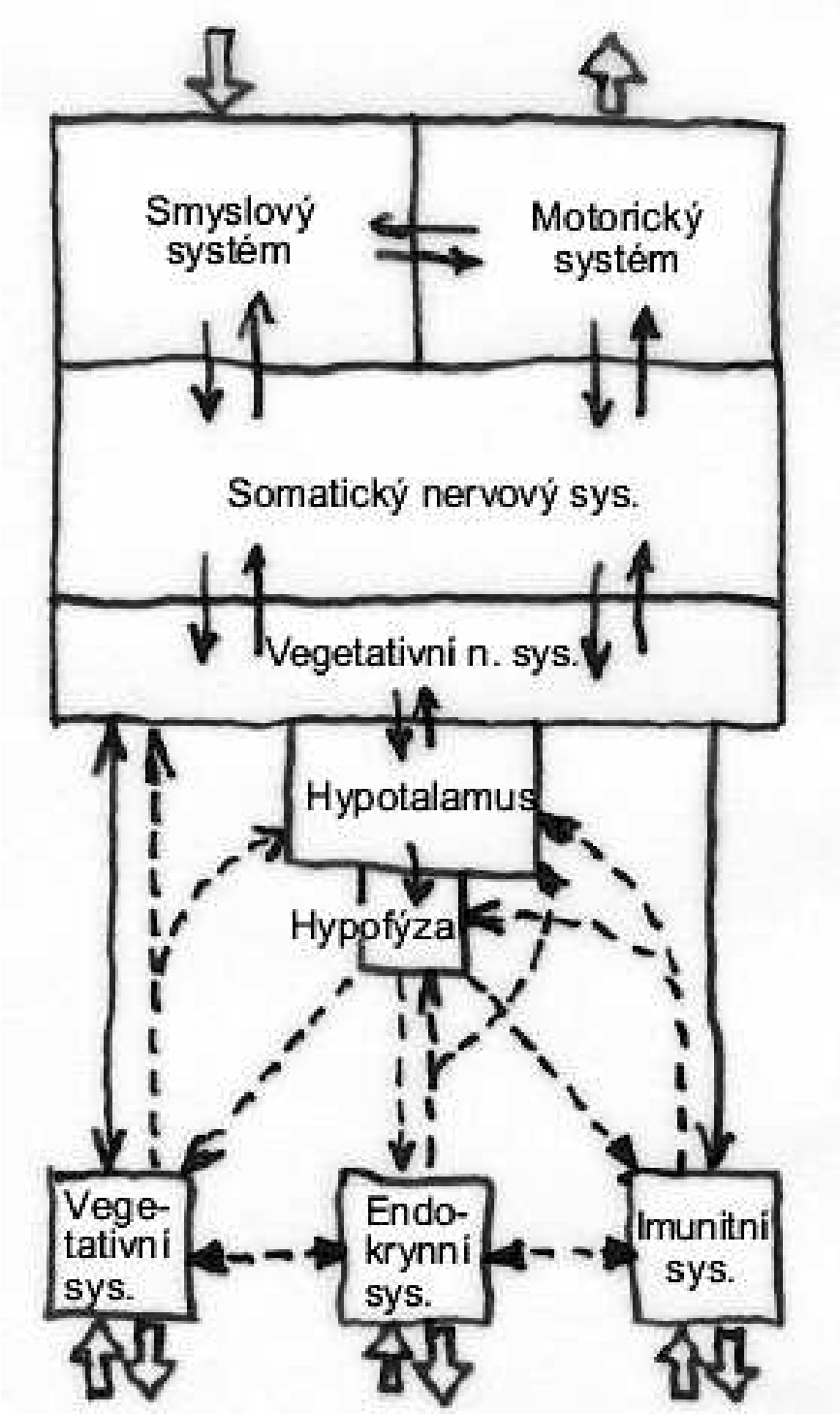
střevo

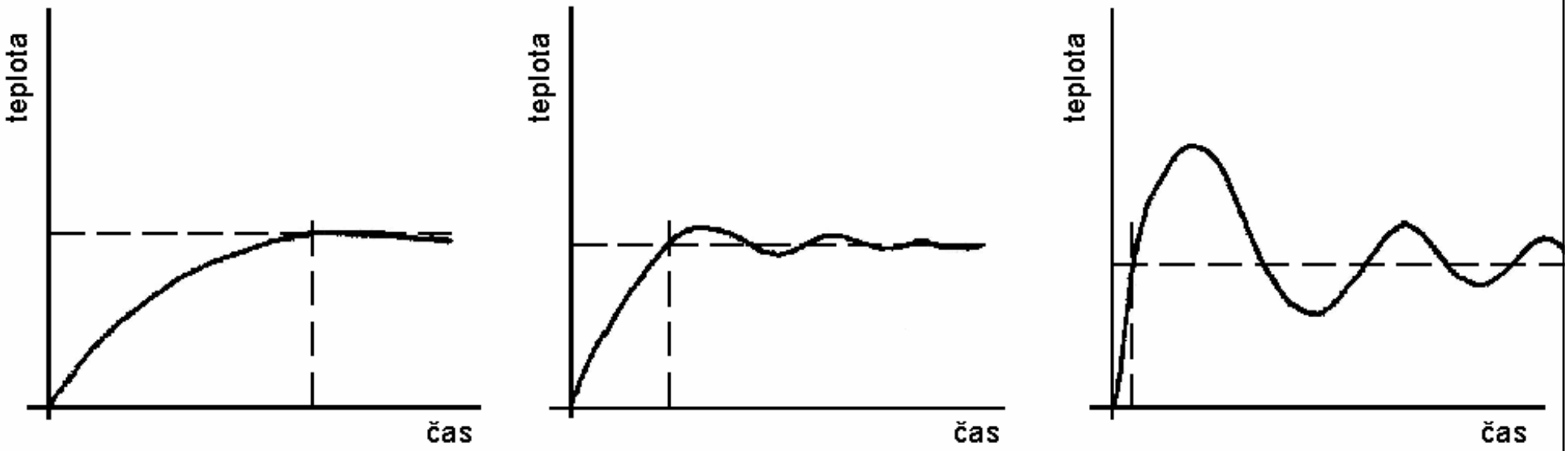


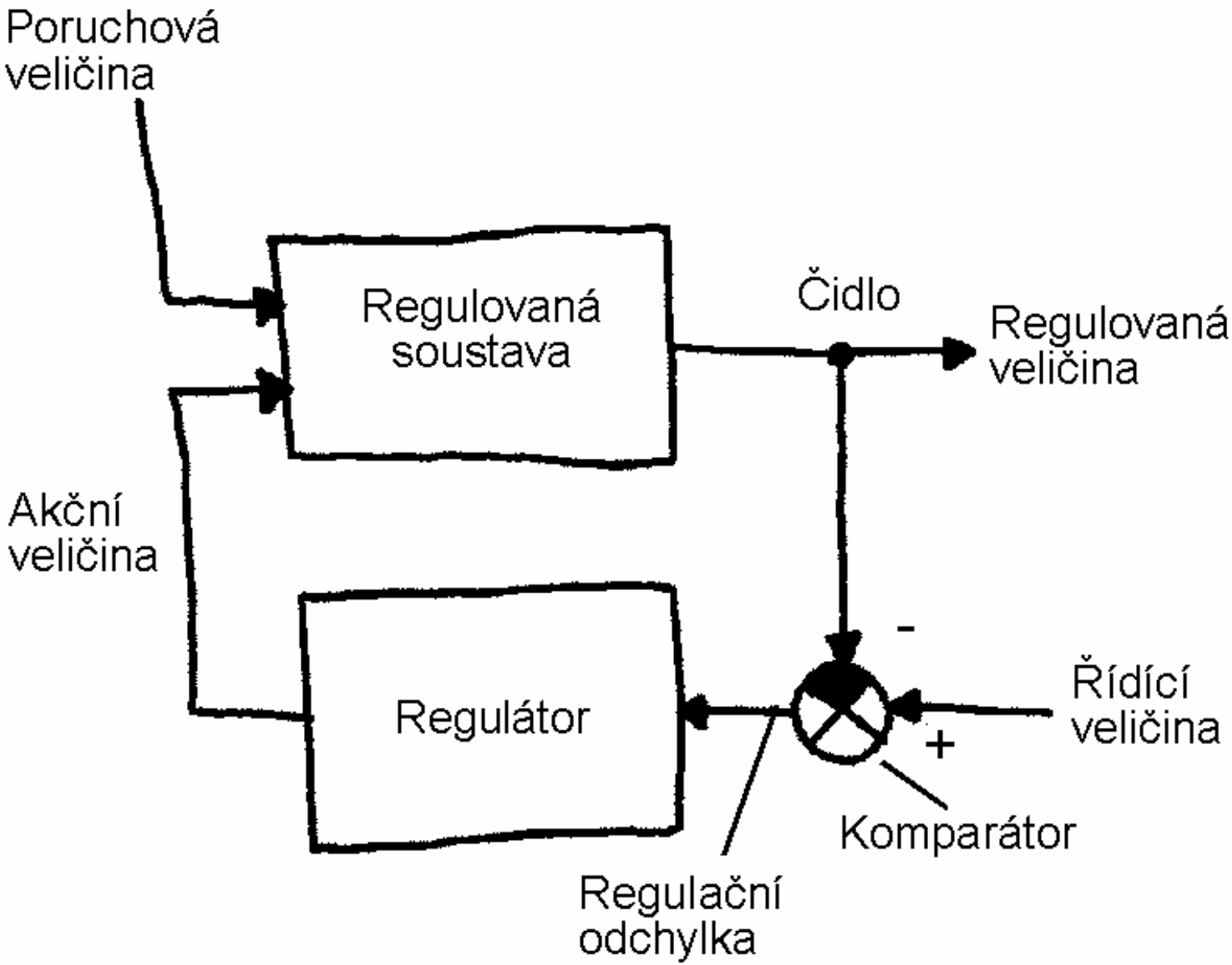
kapiláry



plíce


Smyslový systém
Motorický systém
Somatický nervový sys.
Vegetativní n. sys.
Hypotalamus
Hypofýza
Vege-tativní sys.
Endo-krynní sys.
Imunitní sys.


teplota
čas
teplota
čas
teplota
čas


Poruchová veličina
Regulovaná soustava
Čidlo
Regulovaná veličina
Akční veličina
Regulátor
-
+
Řídící veličina
Komparátor
Regulační odchylka